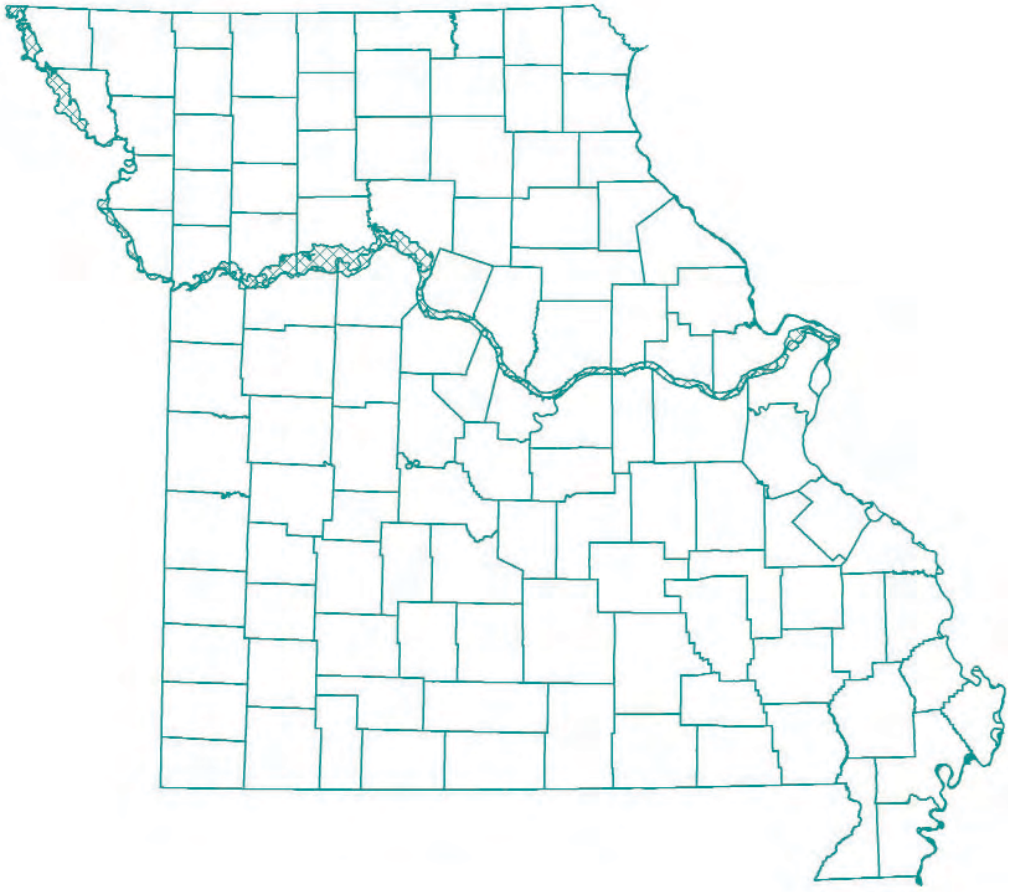
Forest Research

Missouri Department of Conservation

Report No. 3

Missouri River Flood Plain Landowners: Knowledge and Behavior

A Public Attitude Survey and Analysis



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Missouri River Flood Plain Landowners:

Knowledge and Behavior

A Public Attitude Survey and Analysis

by

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Abstract

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Two mail surveys were used to characterize the current forest practice and forest market knowledge of Missouri River flood plain landowners and their hypothetical behavior under cost-share programs designed to encourage flood plain reforestation. Only 9% of responding flood plain landowners had a forest management plan, although two-thirds had forest, timber or wood lots on their flood plain property. This gap presents both a challenge and an opportunity for natural resource professionals working with and through flood plain landowners to improve the flood plain forest resource. The key factors influencing flood plain landowners' forest management decisions were tax incentives, cost-share programs and the cost of professional forestry advice. Flood plain landowners had a long-term planning horizon, long-term tenancy and a strong desire to pass on their land in good condition to their children and grandchildren, but they were worried that no one from their families will own the land 25 years from now. Few flood plain landowners were getting forestry information from either the Missouri Department of Conservation or University of Missouri Extension, but those who did rate the quality of service highly. Few flood plain landowners undertook any forest management practices other than timber sales. They were as a group well-informed about forest product markets. Up to 13% of privately-owned flood plain land would be enrolled in a government cost-share tree-planting program.

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Introduction

The bottomland forests in the upper Mississippi and Missouri River valleys, along with their tributaries, are some of the richest and most diverse ecosystems in the world. These Big River flood plains provide a treasure of economic and ecological values. Some of these values include mitigating the erosive nature of stream channel dynamics, improving water quality, protecting levees and other structural improvements, production of forest products, moderation of storm flow events, travel lanes for wildlife and aquatic habitat (Malanson 1995). Hard-mast producing trees such as the oaks provide food stores and niche habitats for such species as eastern wild turkey, white-tailed deer, fur-bearing mammals, birds and waterfowl.

Since the early settlement by Europeans and early settlers in the Midwest, the extent of bottomland forests has been greatly reduced. The riparian forest corridor with its network of tributaries and the Big Rivers were severely fragmented as these forests were cleared for agricultural production (Brinson et. al 1981, Turner et. al 1981, Malanson 1995). In addition to the vast acreage that was cleared for agricultural production, large flood control projects have created a disjointed connection between the Big Rivers and their tributaries. The spatial extent of the loss of critical wildlife and fish habitat, increased sediment loads, reduced flood water retention and the economic value of riparian forests were not only caused by long-term deforestation and drainage but, unfortunately, the remnants were adversely impacted by the floods of 1993 and 1995 (Stanturf et. al 2000).

The Mississippi and Missouri River valleys are some of the most endangered ecosystems in the United States (Noss et. al 1995). Almost 70% of the hard mast-producing oak species in the Ted Shanks Conservation Area in northeastern Missouri were killed following the floods of 1993 and 1995. This area is one of the largest forested tracts along the Mississippi Valley north of St. Louis. Following the 1993 flood researchers at the University of Missouri conducted an extensive survey of forests along the big rivers in Missouri, Illinois and Iowa. Pin oak (*Quercus palustris Muenchh.*) was found to have the second highest mortality rate (57%) of the 10 species studied. Following the flood landowners along the tributaries harvested large trees because they had been pushed over or damaged by floodwaters. Restoring these flood plain forests is the subject of considerable interest and activity (Sharitz 1992).

One recurring problem in these flood plain forests is sustaining mature oaks or securing adequate regeneration in the understory. In both the public and private sectors, there is a growing interest to improve the understanding of riparian forest ecosystems and to develop management techniques that ensure the sustainability of this important resource. The U.S. Department of Agriculture's continuous Conservation Reserve Enhanced Program (MOCREP 2000) focuses on riparian buffers. The purpose of this program is to remove nutrient, sediment, organic matter, pesticides and other pollutants from surface runoff and subsurface flow, and to create shade to lower water temperatures, and to provide a source of wood detritus and large woody debris for aquatic organism habitat. Riparian buffers have substantial economic value in reducing agricultural non-point source pollution in a Missouri watershed (Qiu and Prato 1998).

One of the outgrowths of the flood of 1993 was the design and development of the Agroforestry Floodplain Initiative whose purpose is to analyze the physical, biological, ecological, economic

and social benefits of flood plain buffers. The Oak Reforestation Project is just one of many in the initiative and its goal is to develop techniques for the establishment of oak plantings within the flood plain. Arising from this project is the need to improve our understanding of the factors that will influence landowners and managers to adopt technical information and programmatic efforts to reforest these flood plain areas.

To better understand landowner knowledge, motivation and behavior, we used a self-administered survey questionnaire directed to flood plain landowners. Our goal was to characterize who owned these lands, what they knew about forestry options, what they thought of public sources of forestry and land management advice, and what they would do if offered a cost-share incentive to participate in flood plain forest reforestation.

The key to reforestation of the flood plain is the private landowner who owns and farms the lands adjacent to the rivers and riparian areas. At this time, we do not know much about their goals for ownership of this land, nor do we know much about whether they would be interested in adopting a plan that would incorporate trees in these flood plain areas. Recent research has shown that farmers will elect to plant a buffer unless the net crop price is high or the land rental rate is low. The choice of buffer type, trees or grass, is affected by crop price, farm size, relative incentive payments, relative cost share rates and amount of deer damage (Lynch and Brown 2000). The economics of restoring private lands to forests will gain in importance. Landowners can derive periodic income from timber production. Annual income from hunting leases or carbon credits will also be available for some landowners (Stanturf et al. 2000).

Methods

To prevent confounding between questions designed to elicit information on the knowledge or attitudes of the respondents and questions designed to elicit information on how respondents do or would behave, two separate surveys were designed and tested. The "Knowledge Survey" included questions on whether or not timber markets existed in the respondents' areas, and where they would go for more information on markets or to find out about ways to get an annual income from forested flood plain land. (See Appendix 1, page 49.) The "Behavior Survey" included questions about how respondents currently manage their land, what forest management practices (if any) they employ, whether they have a management plan and, if so who helped them develop it, and whether, at various cost-share levels, they would participate in a flood plain forest reforestation program. (See Appendix 2, page 56.)

The two surveys shared a set of questions in common to allow for comparison across surveys — between knowledge and behavior. This set included questions about long- and short-term goals and opinions of the forestry service received from different government agencies. There were also a common set of demographic questions on age, gender and income that allowed the testing of the hypothesis that the two sets of respondents come from the same general population. This set also included questions on land tenancy and land characteristics.

Flood plain land outside the levee in thirteen counties bordering the Missouri River was chosen as the study area. The counties were Boone, Callaway, Carroll, Chariton, Cole, Cooper,

Gasconade, Howard, Moniteau, Montgomery, Osage, Saline and Warren (see Figure 1). Together they represent 49% of the Missouri River's flood plain in the state (Missouri Department of Conservation 2001).

A complete list of flood plain landowners in these 13 counties was developed by visiting each county courthouse and visually identifying qualifying land from aerial photomaps. The owners of qualifying land were then identified using the counties' plat books. At the same time the number of acres owned by each was recorded. Due to the differing ways in which counties keep records and aerial photographs, it was not always possible to record only the number of flood plain acres owned. Using available GIS coverages (Missouri Department of Conservation 2001) we were able to estimate the overall ratio of flood plan land to land owned. Only private landowners were included on the final mailing list. From the resulting list a sample of 633 names were randomly drawn and assigned to one of two groups. The first group received the Knowledge Survey and the second group received the Behavior Survey.

The mailings followed Dillman's (1978, 2000) methodology. An initial letter advising recipients of the upcoming survey was mailed in October 2000. One week later recipients were mailed a copy of the survey along with instructions and a cover letter restating the goals of the research and its voluntary and anonymous nature. Four days after the first mailing, recipients were mailed a reminder postcard, asking them to be sure to fill in their survey. One month after the initial mailing of the survey, non-respondents were mailed a second copy along with a cover letter stressing the importance of their participation. (See Appendices 3-6, page 64.)

Of the initial 633 names, 45 proved to be bad or changed addresses with no forwarding information. Of the remaining 588 recipients, two asked to be removed from the mailing list because they no longer owned the land in question. This left a list of 586 suitable addresses. The first mailing of the survey yielded 304 responses, a response rate of 51.8%. The second mailing of the survey to non-respondents (282) yielded 40 responses, a response rate of 14.2%. The total response rate, over both mailings, was 58.7%. The two surveys, "Knowledge" and "Behavior," were returned with similar response rates. The response rate for the Knowledge Survey was 59.3% (168/283). The response rate for the Behavior Survey was 58.1% (176/303).

Due to land sales or transfers, misidentification of flood plain lands or other (unstated) reasons, 23 Knowledge and 43 Behavior survey responses were removed from the data set as not being from owners of flood plain land. The final sample size for the Knowledge Survey was 145, or a response rate of "good land parcels" of 55.7% (145/260). The final sample size for the Behavior Survey was 133, a response rate of 51.2% (133/260). In all, 11.2% (66/586) of the "good" mailing list were respondents who did not identify themselves as flood plain landowners. The overall response rate for both surveys was 53.5% (278/520).

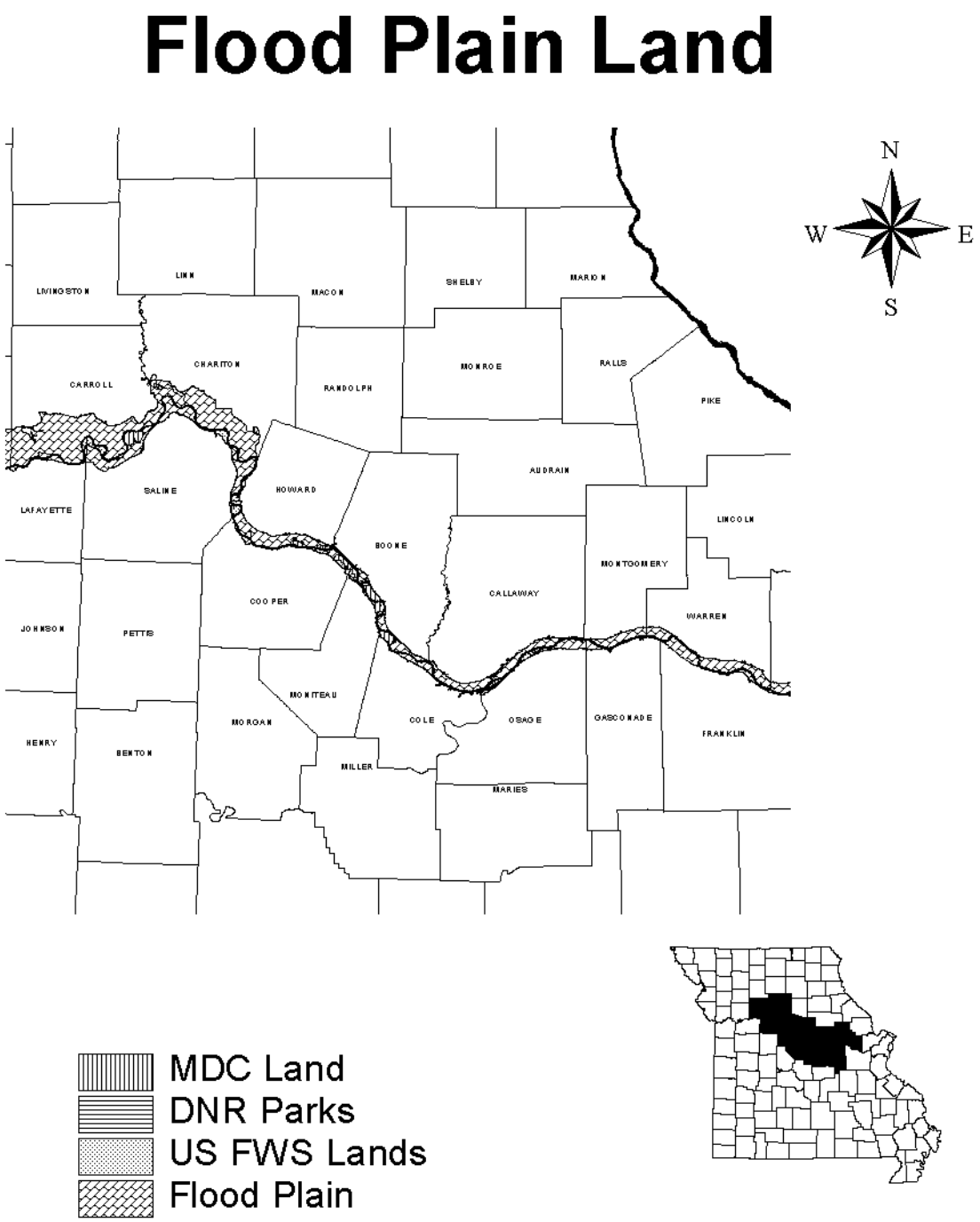

Figure 1 - The study area showing the flood plain land in 13 mid-Missouri counties and its ownership.

All answers on both surveys were numerically coded and entered in a computerized database. Where possible, data were coded on an ordinal scale. For example, answers to the question "What is your annual income?" that had the possible answers "Under $20,000", "$20,000 to $40,000", "$40,001 to $60,000", or "$60,000 or over", were coded numerically as 1,2,3 and 4. This ordinal coding allowed for easier data analysis at later stages. Purely nominal responses were coded numerically but no meaning should be attached to these numbers. When no answer for a particular question was checked, the response was coded as missing. For questions, with the instruction "Check the boxes that apply", unchecked boxes were coded (numerically) as "No/Does not apply", rather than as missing.

For questions, 7a, 7b, 7c, 7d and 9 from the Knowledge Survey, "Are there markets for timber/loggers/timber buyers/sawmills in your area?" and "Are there ways to earn an annual income from forested flood plains?", the answers "No" and "Don't know" were collapsed together as a single coded, incorrect answer. Based on various Missouri Department of Conservation publications (Missouri Department of Conservation 2000, Missouri Department of Conservation 1995, Missouri Department of Conservation 1991) that are specific to the county level we decided to treat "Yes" as the "correct" answer. There were also four open-ended questions on the Behavior Survey: "How many acres would you enroll?" in a reforestation program at various cost-share levels. Answers to these questions were entered numerically, with a code for missing data. The number of acres owned by each respondent was also coded numerically (see above).

Data analysis was accomplished using SAS software. We produced a set of summary statistics for each categorical question using SAS PROC FREQ (see page 19). For the numeric questions, the number of acres that a respondent said they would enroll in a cost-share reforestation program and the total number of acres they owned (taken from county plat books, not from the survey), SAS PROC MEANS was used.

Results

Non-Respondent Bias

Any analysis of a survey with a 53.5% response rate must immediately raise questions of non-respondent bias. Although this project did not include a specific non-respondent study, the two mailings do allow for some analysis. By comparing the answers of those who responded to the first mailing and those who responded to the second, we can test the hypothesis that they come from the same overall population. If they can be said to come from the same population, then we can argue that non-respondent bias is less of a problem, although this argument will be based on only two data points.

To maximize the sample size for this test, only questions which appeared on both the Knowledge and the Behavior Surveys are considered. (This, in turn, assumes that respondents to the two surveys come from the same overall population. See below.) There were 38 categorical questions shared between the two surveys, but this analysis will ignore the first two, which ask whether the respondent actually owns flood plain land.

Using SAS PROC FREQ/CHISQ to perform Chi tests on responses to these 36 questions with a dummy variable indicating which mailing (1 or 2) was responded to, indicates that in only one of the 36 cases can the null hypothesis that the two populations are the same be rejected at the 5% level (see Table 1, page 7). The one question allowing rejection is "What quality of forestry service (from 5 = high to 1 = low, NA = don't know/irrelevant) would you expect from the University of Missouri Extension?". Based on the failure to reject the null in 35 of the 36 tests, non-respondent bias does not appear to be a problem with this study.

Differences in Populations Receiving the Two Surveys

We can use the same procedures to test whether the respondents to the two surveys come from the same overall population. Again there are 36 overlapping categorical questions for which SAS PROC FREQ/CHISQ was used to test whether the null hypothesis that the two populations were the same could be rejected at the 5% level (see Table 2, page 8). Again only one of the 36 questions allows rejection. The one question allowing rejection is "What quality of forestry service (from 5 = high to 1 = low, NA = don't know/irrelevant) would you expect from the Farm Bureau?". Based on the failure to reject the null in 35 of the 36 tests, the two samples appear to be drawn from the same overall population, allowing for comparisons between the two data sets.

Question (from Knowledge/Behavior surveys)	ChiSq	DF	Prob	N
3:Length of ownership:	0.229	3	0.972	258
4:Length of family ownership:	4.815	4	0.306	256
5:Live on land:	0.026	1	0.872	259
6/8:Have timber	0.391	1	0.531	245
10/11A:Short-term goal: Timber revenue	3.998	4	0.406	175
10/11B:Short-term goal: Other forest products	2.381	4	0.666	157
10/11C:Short-term goal: Land for family hunting	4.634	4	0.326	185
10/11D:Short-term goal: Row crops	2.983	4	0.560	214
10/11E:Short-term goal: Pasture	0.967	4	0.914	165
10/11F:Short-term goal: Lease hunting revenue	2.357	4	0.670	158
10/11G:Short-term goal: Wildlife viewing	5.447	4	0.244	180
10/11H:Short-term goal: Soil conservation	4.896	4	0.298	172
10/11I:Short-term goal: Leaving land for children	1.935	4	0.747	203
10/11J:Short-term goal: Scenic beauty	1.406	4	0.843	181
11/12:Meeting Short-term goals	0.062	1	0.803	253
12/13A:Long-term goal: Timber revenue	1.964	4	0.742	175
12/13B:Long-term goal: Other forest products	2.366	4	0.668	157
12/13C:Long-term goal: Land for family hunting	9.351	4	0.052	174
12/13D:Long-term goal: Row crops	2.200	4	0.699	217
12/13E:Long-term goal: Pasture	3.548	4	0.470	159
12/13F:Long-term goal: Lease hunting revenue	4.702	4	0.319	161
12/13G:Long-term goal: Wildlife viewing	2.432	4	0.656	175
12/13H:Long-term goal: Soil conservation	3.675	4	0.451	175
12/13I:Long-term goal: Leaving land for children	4.691	4	0.320	198
12/13J:Long-term goal: Scenic beauty	1.029	4	0.905	180
13/14:Meeting Long-term goals	0.008	1	0.930	251
16/19A: Quality of forestry service: MDA	4.434	4	0.350	133
16/19B: Quality of forestry service: MDC	5.095	4	0.277	152
16/19C: Quality of forestry service: UM-Extension	13.218	4	0.010 *	141
16/19D: Quality of forestry service: DNR	4.314	4	0.365	129
16/19E: Quality of forestry service: NRCS	3.260	4	0.515	125
16/19F: Quality of forestry service: Logger	4.517	4	0.340	126
16/19G: Quality of forestry service: Farm Bureau	2.972	4	0.562	120
17/20:Age	0.830	3	0.842	254
18/21:Gender	2.275	3	0.517	202
19/22:Income	0.203	1	0.652	246

Table 1 - Chi-square test results for non-respondent bias. (* = reject the null at the 5% level.)

Question (from Knowledge/Behavior surveys)	ChiSq	DF	Prob	N
3:Length of ownership:	4.205	3	0.240	258
4:Length of family ownership:	1.349	4	0.853	256
5:Live on land:	0.111	1	0.739	259
6/8:Have timber	3.062	1	0.080	245
10/11A:Short-term goal: Timber revenue	0.847	4	0.932	175
10/11B:Short-term goal: Other forest products	0.126	4	0.998	157
10/11C:Short-term goal: Land for family hunting	1.070	4	0.899	185
10/11D:Short-term goal: Row crops	4.361	4	0.359	214
10/11E:Short-term goal: Pasture	3.301	4	0.508	165
10/11F:Short-term goal: Lease hunting revenue	4.144	4	0.386	158
10/11G:Short-term goal: Wildlife viewing	2.508	4	0.643	180
10/11H:Short-term goal: Soil conservation	6.790	4	0.147	172
10/11I:Short-term goal: Leaving land for children	4.077	4	0.395	203
10/11J:Short-term goal: Scenic beauty	5.243	4	0.263	181
11/12:Meeting Short-term goals	0.498	1	0.480	253
12/13A:Long-term goal: Timber revenue	0.655	4	0.956	175
12/13B:Long-term goal: Other forest products	0.232	4	0.993	157
12/13C:Long-term goal: Land for family hunting	1.185	4	0.880	174
12/13D:Long-term goal: Row crops	0.964	4	0.915	217
12/13E:Long-term goal: Pasture	5.624	4	0.229	159
12/13F:Long-term goal: Lease hunting revenue	0.864	4	0.929	161
12/13G:Long-term goal: Wildlife viewing	2.756	4	0.599	175
12/13H:Long-term goal: Soil conservation	10.164	4	0.037	175
12/13I:Long-term goal: Leaving land for children	3.723	4	0.444	198
12/13J:Long-term goal: Scenic beauty	3.160	4	0.531	180
13/14:Meeting Long-term goals	0.352	1	0.553	251
16/19A: Quality of forestry service: MDA	5.022	4	0.285	133
16/19B: Quality of forestry service: MDC	3.038	4	0.551	152
16/19C: Quality of forestry service: UM-Extension	0.568	4	0.966	141
16/19D: Quality of forestry service: DNR	1.988	4	0.737	129
16/19E: Quality of forestry service: NRCS	3.122	4	0.537	125
16/19F: Quality of forestry service: Logger	4.267	4	0.371	126
16/19G: Quality of forestry service: Farm Bureau	13.899	4	0.007 *	120
17/20:Age	6.423	3	0.092	254
18/21:Gender	2.642	3	0.450	202
19/22:Income	0.758	1	0.383	246

Table 2 - Chi-square test results for difference in populations receiving the two surveys. (* = reject the null at the 5% level.)

Differences between Owners and Non-owners

Due to land sales and other causes, a portion of the surveys were mailed to non-owners of flood plain land. This allows us to compare the populations of owners and non-owners for the few questions (3) that both owners and non-owners were asked to answer. Again the null hypothesis that the two populations are the same (for these three variables) cannot be rejected at the 5% level.

Question (from Knowledge/Behavior surveys)	ChiSq	DF	Prob	N
17/20:Age	1.534	3	0.674	314
18/21Income	5.749	3	0.124	247
19/22:Gender	2.710	1	0.099	300

Table 3 - Chi-square test results for difference in owners and non-owners.

The Typical Flood Plain Landowner

The above results allow us to characterize the typical flood plain landowner using data from both mailings of both surveys. Using the midpoints of ranges in the questions, the average age of respondents was 56.8 years. The average respondent reported an annual income of $43,707. Using data from county plat books, each owned on average 160.6 acres of land. We estimated, based on available GIS coverages (Geographic Resource Center 1994, Missouri Department of Conservation 2001) that 68.3 acres of that total was flood plain land for the average landowner. The surveys reveal that the respondents had owned that land for an average of 17.9 years and that the land had been in the family for 35.1 years. In a question asked only on the Behavior Survey, 72.2 % of current land owners said that they thought it either “every unlikely” or “unlikely” that someone from their family would continue to own their land in 25 years. The vast majority of respondents were male (77.6%). Only 17.8% of the respondents reported that they lived on their flood plain land. There were 64.5% of respondents who said that they had “forest, timber or wood lots” on their flood plain land.

The most important short-term goal (defined as less than 5 years) for all land owners was “row crops”, which ranked at an average 4.1 on a scale of 5 (“very important”) to 1 (“unimportant”). Responses to this question were grouped at the extreme with 73% answering “very important” and 19% answering “unimportant”. The next most important short-term goals were “leaving land for children/grandchildren” (4.0), “soil conservation” (3.6) and “scenic beauty” (3.3). The least important short-term goals were “other forest products” (1.6), “pasture” (1.6) and “lease hunting revenue” (1.6). “Timber revenue” averaged 2.0 and was listed as “unimportant” by 58.9% of respondents. Most landowners (83.7%) said that they were meeting their short-term goals for their flood plain land.

Long-term goals (defined as over 5 years) differed only slightly from short-term goals (see below). “Row crops”, at 4.1 on a scale of 5 remained the highest ranked but “leaving land for children/grandchildren” (4.1) was equal. “Soil conservation” (3.7) and “scenic beauty” (3.3) again rounded out the top goals. “Pasture” (1.5), “other forest products” (1.5) and “lease hunting revenue” (1.8) were again at the bottom. “Timber revenue” averaged 2.1 and was listed as

"unimportant" by 55.4% of respondents but as "very important" by 14.3%. Again, most landowners (85.7%) said they were meeting their long-term goals.

The Knowledge Survey

Respondents to the Knowledge Survey correctly stated that there were timber markets in their area (75.9%), loggers in their area (60.9%) and timber buyers (53%). They were less well informed about sawmills (46.6% knew that there were mills in their area) and about the existence of ways to earn an annual income from forested flood plain land (only 21.9%). The most common sources of information about timber markets and mills were timber buyers/loggers (46.9%) and neighbors/friends (34.5%). Only 26.2% viewed the Missouri Department of Conservation (MDC) as a source of such information. University of Missouri Extension was noted by only 20%. The most common sources of information about ways to earn an annual income from forested flood plain land were the Missouri Department of Agriculture (MDA) at 26.2% and "Don't Know" (also 26.2%). Only 23.5% would seek this information from MDC. University of Missouri Extension was noted by 24.8%.

Landowners' chief sources for information on planning and managing flood plain land were the MDA (28.9%) and the Soil & Water Conservation District (27.6%). MDC was listed by 25.5% of respondents and University of Missouri Extension by 24.8%. Respondents were also asked to rate the "quality of forestry service" (from 5 = "high" to 1 = "low") from several of these sources. Both MDC and University of Missouri Extension were ranked at an average of 3.2 of 5. MDA ranked at 3.0 and timber buyers/loggers at 2.6.

The Behavior Survey

The most common current management of flood plain land was "row crops" with 67.7% of respondents. Other top current management uses were "wildlife habitat" (30.8%) and "land for family hunting" (27.1%). "Agroforestry" (0%), "lease hunting" (4.5%) and "pasture" (5.2%) were the least common. The most commonly implemented forest management practices were "timber sales" (24%) and "timber stand improvement" (7.5%). The least common were "forest health management" (0%), "fencing" (1.5%) and "burning" (2.3%). About 9% of respondents reported undertaking firewood cutting.

Respondents to the Behavior Survey were asked to rank (from 5 = "very likely to affect my decision" to 1 = "very unlikely to affect my decision") the factors that affected their forest management decisions. The highest ranked factors were "government cost share programs" (3.3) and "tax incentives" (3.2). "Lack of timber markets" (2.3) and "lack of markets for other forest products" (2.4) were the least likely to affect their decisions.

Only 9% of respondents said that they had ever developed a forest management plan for their flood plain land. Of that small number, 36.4% had received help with their plan from MDC and 27% percent from "no one". None reported receiving help from University of Missouri Extension. Respondents were also asked to rate the "quality of forestry service" (from 5 = "high" to 1 = "low") from several sources (whether or not they had a forest management plan). MDC

was rated at an average 3.5 and University of Missouri Extension 3.3. MDA ranked 3.4 and timber buyers/loggers and the Natural Resource Conservation Service 2.6.

Respondents to the Behavior Survey were asked whether they would enroll any or all of their flood plain land in a hypothetical state government cost-share program aimed at reforesting hardwood bottomland forests. The survey included a detailed description of the hypothetical scenario as well as several possible cost share levels. At a 10% owner/90% state cost-share, with a final cost of $50/acre to the landowner, 33.3% of respondents said that they would enroll land. At this level the average hypothetical enrollment was 28.1 acres, representing 25.9% of the total land owned by the hypothetical enrollees and 44.4% of their flood plain land. At a 25% owner/75% state cost-share, with a final cost of $125/acre to the landowner, 15.8% of respondents said that they would enroll land. Here the average enrollment was 23.4 acres, representing 33.5% of land enrollees owned and 50.3% of their flood plain land.

At a 35% owner/65% state cost-share, with a final cost of $175/acre to the landowner, 6.9% of respondents said "yes". At this cost share the hypothetical enrollment was 30.1 acres on average, representing 48.7% of the land owned by the enrollees and 63.1% of their flood plain land. At a 50% owner/50% state cost-share, with a final cost of $250/acre to the landowner, 6.9% of respondents again said "yes". Hypothetical enrollment was 28.3 acres on average, representing 47.7% of the enrollees' land and 60.9% of their flood plain land.

Short-term vs. Long-term Goals

Data from the two surveys can be used to assess differences between the respondents' short-term (defined as less than 5 years) and long-term (defined as more than 5 years) goals. We used SAS PROC FREQ/CHISQ to perform Chi-square tests on responses to the 10 different goals questions (common for both short- and long-term) as well as the Yes/No question asking whether respondents were meeting their goals, with a dummy variable for short vs. long-term. We found that for none of these questions could we reject the null hypothesis that short and long-term goals were the same at the 5% level (see Table 4, page 12).

Question	Chi SQ	DF	Prob	N
A: Goal: Timber revenue	2.394	4	0.663	350
B: Goal: Other forest products	1.883	4	0.757	314
C: Goal: Land for family hunting	1.117	4	0.891	359
D: Goal: Row crops	1.578	4	0.812	431
E: Goal: Pasture	1.384	4	0.846	324
F: Goal: Lease hunting revenue	4.595	4	0.331	319
G: Goal: Wildlife viewing	0.958	4	0.916	355
H: Goal: Soil conservation	4.442	4	0.349	347
I: Goal: Leaving land for children/grandchildren	1.528	4	0.821	401
J: Goal: Scenic beauty	1.263	4	0.867	361
Meeting Goals	0.337	1	0.561	504

Table 4 - Short and Long-term Goals Chi-square test results.

Discussion

This survey was limited to landowners along the Missouri River in the central portion of the state but the results might easily extend to landowners along other river systems throughout the state. Missouri's privately-owned flood plain land has seen little turnover (17.9 years owned and 35.1 years in the family) compared to other lands, but current owners are worried that the next generation may not continue the tradition. Since one of the respondents' highest goals for owning such land was the bequest motive (leaving land in good condition for children and grandchildren), this is a serious problem. This is not land that most landowners live on because it does flood. Instead the decision factors that they rank highest when making forest management decisions (and presumably other land management decisions) have mostly to do with money — government cost share programs and tax incentives, and the cost of professional advice. Most landowners use their land for row crops, the traditional source of annual income from such land, even if it may prove incompatible with goals linked to a bequest motive.

Most of these landowners say that they have some timber on their flood plain lands but they seem unaware of what can be achieved from this resource, either in terms of income or in terms of meeting other, non-monetary goals. Landowners know about timber markets in their areas but not about specifics, such as sawmills. Neither do they know that forested land can produce an annual income. Respondents ranked "other forest products" and "lease hunting revenue" as at a low level, despite their overall interest in monetary issues, confirming their lack of knowledge about forests as sources of income.

Both the Missouri Department of Conservation and University of Missouri Extension offer forestry assistance to private landowners. MDC employs several hundred resource professionals

in its Forestry and Private Lands Divisions and administers several cost-share and technical assistance programs, as well as the Forest Cropland Program that provides property tax incentives for managing forest lands. The University of Missouri offers programs such as Tree Farm Days and the Master Tree Farmer program. The flood plain landowners we surveyed seemed, for the most part, unaware of these services, although those that do know them rate them highly.

Landowners in this survey rated the cost of professional forestry advice as one of the more important factors when making forest management decisions. They also rated government cost-share programs and tax incentives as important decision factors. Seemingly they are unaware that MDC and MU advice is provided free of charge and that enrollment in existing cost-share and tax incentive programs is open to them. Perhaps this lack of outside advice is why the only forest management practice employed by a substantial number of these landowners is timber sales.

Very few flood plain landowners have a forest plan, which again may be explained by their lack of awareness of good sources of advice, but neither is forest management one of their primary goals. The highest ranked goal (both short- and long-term) was the production of row crops. Forestry related goals, such as timber and other forest products, seemed unimportant to them. Even other goals where forest management might play an important role, such as family or lease hunting, were relatively unimportant.

Landowners had consistent goals for the short- and long-term. After row crops, the bequest value of the land appeared to be the highest goal — soil conservation, scenic beauty and leaving land for future generations. Landowners report that they are meeting both their short- and long-term goals, but are they really? They certainly report that their current management is overwhelmingly for row crops. It is unclear whether high production row crops on flood plain land can meet these bequest goals however.

Is this a forestry problem? Yes. Since the 18th century the United States has lost over 50% of its wetlands and forested flood plains (Bragg and Tatschl 1977, Dahl 1990, The Nature Conservancy 1992). Much of this loss has been to conversion to agriculture. There are many competing claims on this land from private and public interests, but one of its highest values is as a functioning ecosystem. Flood plain forest restoration on public land is not enough; in Missouri the vast majority of this land is privately owned. Those interested in forest restoration must work with private landowners. Nearly two-thirds of the flood plain landowners we surveyed report that they have forest, timber or wood lots on their flood plain land, yet not only are they not reforesting their land, the majority are not doing any forest management at all.

It is equally clear that the efforts of agencies such as MDC and MU are also lacking. The first step for these entities is to design an education and publicity program to inform landowners that MDC and MU have trained personnel who dispense free advice on how and why they might want to manage their flood plain lands. Landowners need to be informed that state programs already exist to cost-share forestry practices and reduce tax burdens. The information that resource professionals have gathered about income opportunities, markets and products also need to be made more widely available.

We have shown that these landowners have a relatively long-term planning horizon that opens the way for consideration of forest management planning efforts. Both MU and MDC have a good reputation among these landowners and it is time to "spend" some of that capital. Resource professionals working with landowners need to help them address the difficult questions. Are the row crops so many produce really compatible with the bequest motives, soil conservation and scenic beauty they say they want to achieve? Can income from forestry (including agroforestry and non-traditional forest products) fit into their land use decisions for their flood plain land? MU and MDC need to determine how they can incorporate their message into the information offered by other entities, such as the Missouri Department of Agriculture, from whom these landowners receive advice. Other possibilities include levee districts and the Natural Resource Conservation Service.

Education and publicity for existing programs may not prove enough however to meet the goals of natural resource professionals. Natural regeneration is the preferred method for restoring flood plain forests because it is the least expensive (Dey et al. 2001). But natural regeneration does not always produce the desired forest in these altered ecosystems, especially the later successional hardwoods such as oaks, walnut and hickories. To encourage this sort of reforestation, it may become necessary to design a cost-share program such as the hypothetical one presented to respondents in our Behavior Survey.

The data from the Behavior survey allows us to estimate a demand curve for flood plain forest restoration on private land (as defined in the questionnaire). Possible cost levels, enrollment levels, total acres enrolled and total costs can also be predicted.

At the lowest cost level, up to 33% of landowners say they would enroll up to 44.4% of their flood plain land. Using our GIS estimates for the total amount of flood plain land owned by enrolling and non-enrolling respondents, we estimate that approximately 13% of all private flood plain land would be enrolled at the lowest cost level ($50/acre). Repeating these calculations across the other cost levels yields the demand curve in Figure 2.

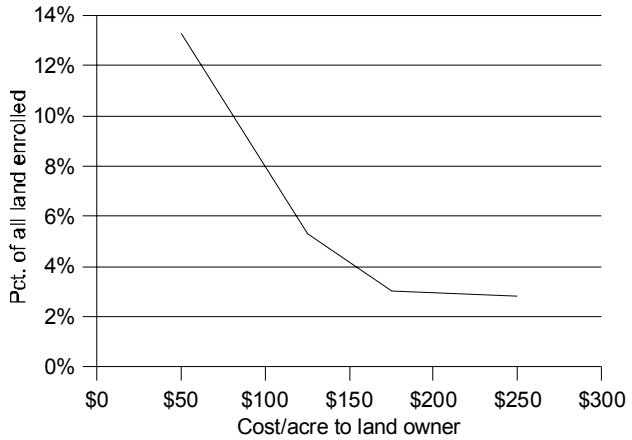

Figure 2 - Percent of all privately owned flood plain land that would be enrolled at a given cost/acre to the private landowner.

The Missouri Department of Conservation GIS flood plain coverage of the Missouri River estimates a total of 34,615 flood plain acres in the 13 counties included in our survey and a total of 71,429 flood plain acres along the Missouri River throughout the state, of which at least 6,754 are in urban areas (Geographic Resource Center 1994, Missouri Department of Conservation 2001). Note that some form of levee protects nearly 75% of this land. Our questionnaire did not attempt to determine whether owners of leveed or non-leveed land were more likely to enroll. A state sponsored program to publicize and support flood plain reforestation, at a cost-share to the landowner of $50 per acre, would, we estimate, enroll 4,611 acres. If the program were extended to the entire Missouri River (excluding the urban areas), enrollment is estimated at 8,616 acres. The same calculations can be made for other cost-share levels.

Dey et al. (2001) test the viability of bare root and two sizes of RPM seedlings on either mounded or unmounded planting sites, with and without a cover crop of red top. Their test plantings consisted of approximately 48 trees per acre. The total per-acre cost of flood plain reforestation, using the various planting methods proposed by Dey et al. varies between $65 and $576 to plant 48 trees per acre (Treiman and Dwyer 2001). The bare root seedlings yield the lower per-acre cost while the RPM seedlings yield the higher cost. Our interpretation of the survival and growth rates that Dey et al. report leads us to select the smaller sized RPM seedlings to calculate the potential costs to the state of a reforestation cost-share program. For example, Dey et al. report 100% survival rate for the first year and reasonable growth for the smaller size class of RPM seedling on unmounded sites with no cover crop. Treiman and Dwyer calculate that these plantings will cost between $511 and $576 per acre, depending on whether or not mounding and cover crops are used.

Note that these costs are based on the "full" flood plain reforestation planting being tested by Dey et al. (approximately 48 trees per acre). The Behavior Survey did not define a particular program to the respondents, only asking whether they would enroll based upon different per acre costs to them. Based on Dey et al.'s work and communications with MDC area managers, silviculturalists and landowners, we estimate that only 20% of the land would actually require the full 48 trees per acre. This is land that would be intensively used, either for agroforestry or for hunting such as duck clubs. We estimate that 30% of the land would only require 5 to 10 trees per acre and the remaining 50% would require 10 to 20 trees per acre. To the extent that these lands can be reforested with fewer trees per acre than Dey et al.'s test plots, program costs will be lower. Treiman and Dwyer (2001) calculate that using the smaller RPM, 5 to 10 trees per acre costs between $73 and $157 per acre depending on mounding and interplantings, and 10 to 20 trees per acre costs between $130 and $273 per acre. The relationship between cost per acre and trees per acre is not linear due to certain fixed costs associated with preparing the site, obtaining equipment, etc.

The figures in Table 5 (page 16) show the costs for a potential cost-share program based on these assumptions. Totals are estimated both for the 13 county survey area and for all lands along the Missouri River. If other rivers are included in any cost-share program, acreages and costs will rise accordingly. Note that at the higher cost-share levels landowners planting 5 or 10 trees per acre may not receive cash assistance, since the per acre cost of the planting will be less than the cost-share threshold. This is reflected in the final column which shows the estimated cost per acre to the state of enrolling flood plain land under the four hypothetical cost-share programs.

If one of the goals of state agencies charged with working with Missouri's private landowners is to increase bottomland forest area and the hardwood component in that forest, these agencies should consider targeting flood plain landowners with a specific cost-share program that will help them defray the costs of planting improved tree seedlings and following optimum techniques. Such a program must not be created in isolation but should be accompanied by landowner education on forest markets, income opportunities and usage. Given the results of these surveys, a cost-share program should require a forest management plan for enrollment.

Cost-share level	Acres enrolled in 13 county area (est.)	Total Acres enrolled along Missouri River (est.)	Cost in 13 county area	Cost along Missouri River	Cost per Acre to State (est.)
$50	4,611	8,616	$894,197	$1,670,874	$ 193.93
$125	1,828	3,416	$223,015	$416,750	$122.00
$175	1,027	1,918	$89,348	$166,865	$87.00
$250	963	1,800	$56,521	$105,648	$58.69

Table 5 - Estimated acreages and costs of a state cost-share program to reforest flood plain lands.

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Statistical Summary

3: Length of ownership:

	Frequency	Percent
Less than 5 years	7	5.19
5 to 15 years	48	35.56
15 to 25 years	31	22.96
25 years or more	49	36.30

Frequency Missing =10

4: Length of family ownership:

	Frequency	Percent
Less than 5 years	6	4.51
5 to 15 years	27	20.30
15 to 25 years	16	12.03
25 to 50 years	21	15.79
50 years or more	63	47.37

Frequency Missing =12

5: Live on land:

	Frequency	Percent
No	110	81.48
Yes	25	18.52

Frequency Missing =10

6: Have timber

	Frequency	Percent
No	52	40.63
Yes	76	59.38

Frequency Missing =17

7A: Know about timber markets

	Frequency	Percent
No	32	24.06
Yes	101	75.94

Frequency Missing =12

7B: Know about loggers

	Frequency	Percent
No	52	39.10
Yes	81	60.90

Frequency Missing =12

7B: Know about timber buyers

	Frequency	Percent
No	63	47.01
Yes	71	52.99

Frequency Missing =11

7D: Know about saw mills

	Frequency	Percent
No	71	53.38
Yes	62	46.62

Frequency Missing =12

8A: Where to find out about timber markets: Missouri Dept. of Agriculture

	Frequency	Percent
No	121	83.45
Yes	24	16.55

8B: Where to find out about timber markets: Missouri Dept. of Conservation (MDC)

	Frequency	Percent
No	107	73.79
Yes	38	26.21

8C: Where to find out about timber markets: University of Missouri Extension

	Frequency	Percent
No	116	80.00
Yes	29	20.00

8D: Where to find out about timber markets: Missouri Dept. of Natural Resources (DNR)

	Frequency	Percent
No	133	91.72
Yes	12	8.28

8E: Where to find out about timber markets: Natural Resources Conservation Service (NRCS)

	Frequency	Percent
No	131	90.34
Yes	14	9.66

8F: Where to find out about timber markets: Soil & Water Conservation District

	Frequency	Percent
No	126	86.90
Yes	19	13.10

8G: Where to find out about timber markets: Timber buyer/logger

	Frequency	Percent
No	77	53.10
Yes	68	46.90

8H: Where to find out about timber markets: Farm Bureau

	Frequency	Percent
No	133	91.72
Yes	12	8.28

8I: Where to find out about timber markets: Neighbor/Friend

	Frequency	Percent
No	95	65.52
Yes	50	34.48

8J: Where to find out about timber markets: Do not Know

	Frequency	Percent
No	115	79.31
Yes	30	20.69

9: Know about annual income from forested land

	Frequency	Percent
No	100	78.13
Yes	28	21.88

Frequency Missing =17

10A: Where to find out about annual income from forests: Missouri Dept. of Agriculture

	Frequency	Percent
No	107	73.79
Yes	38	26.21

10B: Where to find out about annual income from forests: Missouri Dept. of Conservation (MDC)

	Frequency	Percent
No	111	76.55
Yes	34	23.45

10C: Where to find out about annual income from forests: University of Missouri Extension

	Frequency	Percent
No	109	75.17
Yes	36	24.83

10D: Where to find out about annual income from forests: Missouri Dept. of Natural Resources (DNR)

	Frequency	Percent
No	130	89.66
Yes	15	10.34

10E: Where to find out about annual income from forests: Natural Resources Conservation Service (NRCS)

	Frequency	Percent
No	126	86.90
Yes	19	13.10

10F: Where to find out about annual income from forests: Soil & Water Conservation District

	Frequency	Percent
No	125	86.21
Yes	20	13.79

10G: Where to find out about annual income from forests: Timber buyer/logger

	Frequency	Percent
No	132	91.03
Yes	13	8.97

10H: Where to find out about annual income from forests: Farm Bureau

	Frequency	Percent
No	133	91.72
Yes	12	8.28

10I: Where to find out about annual income from forests: Neighbor/Friend

	Frequency	Percent
No	116	80.00
Yes	29	20.00

10J: Where to find out about annual income from forests: Do not Know

	Frequency	Percent
No	107	73.79
Yes	38	26.21

11A: Short-term goal: Timber revenue

	Frequency	Percent
Unimportant	55	60.44
Somewhat unimportant	9	9.89
Somewhat important	14	15.38
Important	6	6.59
Very important	7	7.69

Frequency Missing = 54

11B: Short-term goal: Other forest products

	Frequency	Percent
Unimportant	64	76.19
Somewhat unimportant	8	9.52
Somewhat important	7	8.33
Important	1	1.19
Very important	4	4.76

Frequency Missing = 61

11C: Short-term goal: Land for family hunting

	Frequency	Percent
Unimportant	38	39.58
Somewhat unimportant	7	7.29
Somewhat important	17	17.71
Important	9	9.38
Very important	25	26.04

Frequency Missing = 49

11D: Short-term goal: Row crops

	Frequency	Percent
Unimportant	20	18.18
Somewhat unimportant	1	0.91
Somewhat important	7	6.36
Important	2	1.82
Very important	80	72.73

Frequency Missing = 35

11E: Short-term goal: Pasture

	Frequency	Percent
Unimportant	69	76.67
Somewhat unimportant	6	6.67
Somewhat important	6	6.67
Important	2	2.22
Very important	7	7.78

Frequency Missing = 55

11F: Short-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	64	75.29
Somewhat unimportant	2	2.35
Somewhat important	12	14.12
Important	3	3.53
Very important	4	4.71

Frequency Missing = 60

11G: Short-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	45	46.88
Somewhat unimportant	7	7.29
Somewhat important	13	13.54
Important	8	8.33
Very important	23	23.96

Frequency Missing = 49

11H: Short-term goal: Soil conservation

	Frequency	Percent
Unimportant	18	20.69
Somewhat unimportant	9	10.34
Somewhat important	11	12.64
Important	18	20.69
Very important	31	35.63

Frequency Missing = 58

11I: Short-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	14	13.86
Somewhat unimportant	7	6.93
Somewhat important	13	12.87
Important	9	8.91
Very important	58	57.43

Frequency Missing = 44

11J: Short-term goal: Scenic beauty

	Frequency	Percent
Unimportant	26	26.80
Somewhat unimportant	10	10.31
Somewhat important	18	18.56
Important	9	9.28
Very important	34	35.05

Frequency Missing = 48

12: Meeting short term goals

	Frequency	Percent
No	19	14.62
Yes	111	85.38

Frequency Missing =15

13A: Long-term goal: Timber revenue

	Frequency	Percent
Unimportant	51	55.43
Somewhat unimportant	8	8.70
Somewhat important	13	14.13
Important	7	7.61
Very important	13	14.13

Frequency Missing = 53

13B: Long-term goal: Other forest products

	Frequency	Percent
Unimportant	63	75.00
Somewhat unimportant	6	7.14
Somewhat important	9	10.71
Important	2	2.38
Very important	4	4.76

Frequency Missing = 61

13C: Long-term goal: Land for family hunting

	Frequency	Percent
Unimportant	35	38.46
Somewhat unimportant	8	8.79
Somewhat important	17	18.68
Important	7	7.69
Very important	24	26.37

Frequency Missing = 54

13D: Long-term goal: Row crops

	Frequency	Percent
Unimportant	20	17.86
Somewhat unimportant	2	1.79
Somewhat important	6	5.36
Important	3	2.68
Very important	81	72.32

Frequency Missing = 33

13E: Long-term goal: Pasture

	Frequency	Percent
Unimportant	69	81.18
Somewhat unimportant	7	8.24
Somewhat important	4	4.71
Important	1	1.18
Very important	4	4.71

Frequency Missing = 60

13F: Long-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	61	70.11
Somewhat unimportant	6	6.90
Somewhat important	8	9.20
Important	4	4.60
Very important	8	9.20

Frequency Missing = 58

13G: Long-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	43	46.24
Somewhat unimportant	8	8.60
Somewhat important	17	18.28
Important	7	7.53
Very important	18	19.35

Frequency Missing = 52

13H: Long-term goal: Soil conservation

	Frequency	Percent
Unimportant	19	21.35
Somewhat unimportant	6	6.74
Somewhat important	16	17.98
Important	14	15.73
Very important	34	38.20

Frequency Missing = 56

13I: Long-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	14	13.73
Somewhat unimportant	4	3.92
Somewhat important	11	10.78
Important	10	9.80
Very important	63	61.76

Frequency Missing = 43

13J: Long-term goal: Scenic beauty

	Frequency	Percent
Unimportant	27	28.42
Somewhat unimportant	9	9.47
Somewhat important	18	18.95
Important	8	8.42
Very important	33	34.74

Frequency Missing = 50

14: Meeting long term goals

	Frequency	Percent
No	17	13.08
Yes	113	86.92

Frequency Missing =15

15A: Where to go for information on managing forests: Missouri Dept. of Agriculture

	Frequency	Percent
No	103	71.03
Yes	42	28.97

15B: Where to go for information on managing forests: Missouri Dept. of Conservation (MDC)

	Frequency	Percent
No	108	74.48
Yes	37	25.52

15C: Where to go for information on managing forests: University of Missouri Extension

	Frequency	Percent
No	109	75.17
Yes	36	24.83

15D: Where to go for information on managing forests: Missouri Dept. of Natural Resources (DNR)

	Frequency	Percent
No	131	90.34
Yes	14	9.66

15E: Where to go for information on managing forests: Natural Resources Conservation Service (NRCS)

	Frequency	Percent
No	126	86.90
Yes	19	13.10

15F: Where to go for information on managing forests: Soil & Water Conservation District

	Frequency	Percent
No	105	72.41
Yes	40	27.59

15G: Where to go for information on managing forests: Timber buyer/logger

	Frequency	Percent
No	133	91.72
Yes	12	8.28

15H: Where to go for information on managing forests: Farm Bureau

	Frequency	Percent
No	132	91.03
Yes	13	8.97

15I: Where to go for information on managing forests: Neighbor/Friend

	Frequency	Percent
No	119	82.07
Yes	26	17.93

15J: Where to go for information on managing forests: Do not Know

	Frequency	Percent
No	114	78.62
Yes	31	21.38

16A: Quality of forestry service: Missouri Department of Agriculture

	Frequency	Percent
High	23	28.40
Somewhat high	3	3.70
Medium	25	30.86
Somewhat low	12	14.81
Low	18	22.22

Frequency Missing = 64

16B: Quality of forestry service: Missouri Department of Conservation

	Frequency	Percent
High	20	22.47
Somewhat high	11	12.36
Medium	15	16.85
Somewhat low	20	22.47
Low	23	25.84

Frequency Missing = 56

16C: Quality of forestry service: University of Missouri Extension

	Frequency	Percent
High	14	16.28
Somewhat high	14	16.28
Medium	19	22.09
Somewhat low	19	22.09
Low	20	23.26

Frequency Missing = 59

16D: Quality of forestry service: Missouri Department of Natural Resources

	Frequency	Percent
High	25	32.89
Somewhat high	11	14.47
Medium	17	22.37
Somewhat low	12	15.79
Low	11	14.47

Frequency Missing = 69

16E: Quality of forestry service: Natural Resource Conservation Service

	Frequency	Percent
High	18	24.66
Somewhat high	8	10.96
Medium	26	35.62
Somewhat low	10	13.70
Low	11	15.07

Frequency Missing = 72

16F: Quality of forestry service: Timber buyer/logger

	Frequency	Percent
High	20	25.32
Somewhat high	16	20.25
Medium	26	32.91
Somewhat low	5	6.33
Low	12	15.19

Frequency Missing = 66

16G: Quality of forestry service: Farm Bureau

	Frequency	Percent
High	24	34.78
Somewhat high	12	17.39
Medium	20	28.99
Somewhat low	8	11.59
Low	5	7.25

Frequency Missing = 76

Statistical Summary – Knowledge Survey

17: Age

	Frequency	Percent
20 to 35	4	2.92
36 to 50	36	26.28
51 to 65	44	32.12
65 or over	53	38.69

Frequency Missing = 8

18: Gender

	Frequency	Percent
Male	103	79.84
Female	26	20.16

Frequency Missing =16

19: Income

	Frequency	Percent
Under $20,000	17	15.60
$20,000 to $40,000	29	26.61
$40,001 to $60,000	19	17.43
$60,000 or over	44	40.37

Frequency Missing = 36

Acres Owned (calculated)

	Average	Std Dev	N
Total	156.78	233.50	143
Flood Plain	66.71	99.35	143

N Missing = 2

3: Length of ownership:

	Frequency	Percent
Less than 5 years	12	9.76
5 to 15 years	34	27.64
15 to 25 years	24	19.51
25 years or more	53	43.09

Frequency Missing =10

4: Length of family ownership:

	Frequency	Percent
Less than 5 years	7	5.69
5 to 15 years	19	15.45
15 to 25 years	17	13.82
25 to 50 years	18	14.63
50 years or more	62	50.41

Frequency Missing =10

5: Live on land:

	Frequency	Percent
No	103	83.06
Yes	21	16.94

Frequency Missing = 9

6: Will continue to own the land:

	Frequency	Percent
Very unlikely	75	66.96
Unlikely	6	5.36
Likely	31	27.68

Frequency Missing = 21

7A: Current management: Row crops

	Frequency	Percent
No	43	32.33
Yes	90	67.67

7B: Current management: Pasture

	Frequency	Percent
No	126	94.74
Yes	7	5.26

7C: Current management: Tree farm/timber

	Frequency	Percent
No	107	80.45
Yes	26	19.55

7D: Current management: Wildlife habitat

	Frequency	Percent
No	92	69.17
Yes	41	30.83

7E: Current management: Land for Family Hunting

	Frequency	Percent
No	97	72.93
Yes	36	27.07

7F: Current management: Agroforestry

	Frequency	Percent
No	133	100.00

7G: Current management: Lease hunting

	Frequency	Percent
No	127	95.49
Yes	6	4.51

8: Have timber

	Frequency	Percent
No	35	29.91
Yes	82	70.09

Frequency Missing =16

9A: Current forest practices: Timber Stand Improvement (TSI)

	Frequency	Percent
No	123	92.48
Yes	10	7.52

9B: Current forest practices: Timber sale

	Frequency	Percent
No	101	75.94
Yes	32	24.06

9C: Current forest practices: Forest Health Monitoring

	Frequency	Percent
No	133	100.00

9D: Current forest practices: Fencing

	Frequency	Percent
No	131	98.50
Yes	2	1.50

9E: Current forest practices: Tree planting

	Frequency	Percent
No	127	95.49
Yes	6	4.51

9F: Current forest practices: Burning

	Frequency	Percent
No	130	97.74
Yes	3	2.26

9G: Current forest practices: Firewood cutting

	Frequency	Percent
No	121	90.98
Yes	12	9.02

10A: Short-term goal: Timber revenue

	Frequency	Percent
Unimportant	48	57.14
Somewhat unimportant	9	10.71
Somewhat important	14	16.67
Important	4	4.76
Very important	9	10.71

Frequency Missing = 49

10B: Short-term goal: Other forest products

	Frequency	Percent
Unimportant	56	76.71
Somewhat unimportant	6	8.22
Somewhat important	6	8.22
Important	1	1.37
Very important	4	5.48

Frequency Missing = 60

10C: Short-term goal: Land for family hunting

	Frequency	Percent
Unimportant	30	33.71
Somewhat unimportant	8	8.99
Somewhat important	15	16.85
Important	11	12.36
Very important	25	28.09

Frequency Missing = 44

10D: Short-term goal: Row crops

	Frequency	Percent
Unimportant	21	20.19
Somewhat important	2	1.92
Important	4	3.85
Very important	77	74.04

Frequency Missing = 29

10E: Short-term goal: Pasture

	Frequency	Percent
Unimportant	56	74.67
Somewhat unimportant	2	2.67
Somewhat important	8	10.67
Important	4	5.33
Very important	5	6.67

Frequency Missing = 58

10F: Short-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	49	67.12
Somewhat unimportant	6	8.22
Somewhat important	13	17.81
Important	1	1.37
Very important	4	5.48

Frequency Missing = 60

10G: Short-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	31	36.90
Somewhat unimportant	9	10.71
Somewhat important	16	19.05
Important	7	8.33
Very important	21	25.00

Frequency Missing = 49

10H: Short-term goal: Soil conservation

	Frequency	Percent
Unimportant	14	16.47
Somewhat unimportant	3	3.53
Somewhat important	13	15.29
Important	12	14.12
Very important	43	50.59

Frequency Missing = 48

10I: Short-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	8	7.84
Somewhat unimportant	6	5.88
Somewhat important	8	7.84
Important	10	9.80
Very important	70	68.63

Frequency Missing = 31

10J: Short-term goal: Scenic beauty

	Frequency	Percent
Unimportant	14	16.67
Somewhat unimportant	8	9.52
Somewhat important	16	19.05
Important	16	19.05
Very important	30	35.71

Frequency Missing = 49

11: Meeting short term goals

	Frequency	Percent
No	22	17.89
Yes	101	82.11

Frequency Missing =10

12A: Long-term goal: Timber revenue

	Frequency	Percent
Unimportant	46	55.42
Somewhat unimportant	8	9.64
Somewhat important	13	15.66
Important	4	4.82
Very important	12	14.46

Frequency Missing = 50

12B: Long-term goal: Other forest products

	Frequency	Percent
Unimportant	55	75.34
Somewhat unimportant	4	5.48
Somewhat important	8	10.96
Important	2	2.74
Very important	4	5.48

Frequency Missing = 60

12C: Long-term goal: Land for family hunting

	Frequency	Percent
Unimportant	28	33.73
Somewhat unimportant	5	6.02
Somewhat important	17	20.48
Important	7	8.43
Very important	26	31.33

Frequency Missing = 50

12D: Long-term goal: Row crops

	Frequency	Percent
Unimportant	18	17.14
Somewhat unimportant	1	0.95
Somewhat important	5	4.76
Important	5	4.76
Very important	76	72.38

Frequency Missing = 28

12E: Long-term goal: Pasture

	Frequency	Percent
Unimportant	55	74.32
Somewhat unimportant	3	4.05
Somewhat important	5	6.76
Important	5	6.76
Very important	6	8.11

Frequency Missing = 59

12F: Long-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	49	66.22
Somewhat unimportant	5	6.76
Somewhat important	10	13.51
Important	4	5.41
Very important	6	8.11

Frequency Missing = 59

12G: Long-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	29	35.37
Somewhat unimportant	6	7.32
Somewhat important	18	21.95
Important	7	8.54
Very important	22	26.83

Frequency Missing = 51

12H: Long-term goal: Soil conservation

	Frequency	Percent
Unimportant	12	13.95
Somewhat unimportant	2	2.33
Somewhat important	15	17.44
Important	6	6.98
Very important	51	59.30

Frequency Missing = 47

12I: Long-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	7	7.29
Somewhat unimportant	4	4.17
Somewhat important	9	9.38
Important	6	6.25
Very important	70	72.92

Frequency Missing = 37

12J: Long-term goal: Scenic beauty

	Frequency	Percent
Unimportant	16	18.82
Somewhat unimportant	7	8.24
Somewhat important	20	23.53
Important	11	12.94
Very important	31	36.47

Frequency Missing = 48

13: Meeting long term goals

	Frequency	Percent
No	19	15.70
Yes	102	84.30

Frequency Missing =12

14A: Decision factors: Knowledge of forest growth and health

	Frequency	Percent
Very likely	29	32.58
Likely	8	8.99
Medium	24	26.97
Unlikely	7	7.87
Very unlikely	21	23.60

Frequency Missing = 44

14B: Decision factors: Availability of professional advice

	Frequency	Percent
Very likely	27	30.68
Likely	9	10.23
Medium	25	28.41
Unlikely	6	6.82
Very unlikely	21	23.86

Frequency Missing = 45

14C: Decision factors: Cost of professional advice

	Frequency	Percent
Very likely	28	33.73
Likely	4	4.82
Medium	18	21.69
Unlikely	11	13.25
Very unlikely	22	26.51

Frequency Missing = 50

14D: Decision factors: Tax incentives

	Frequency	Percent
Very likely	26	29.21
Likely	5	5.62
Medium	18	20.22
Unlikely	7	7.87
Very unlikely	33	37.08

Frequency Missing = 44

14E: Decision factors: Government cost share programs

	Frequency	Percent
Very likely	24	27.59
Likely	6	6.90
Medium	12	13.79
Unlikely	10	11.49
Very unlikely	35	40.23

Frequency Missing = 46

14F: Decision factors: Conservation easements

	Frequency	Percent
Very likely	31	36.90
Likely	8	9.52
Medium	16	19.05
Unlikely	7	8.33
Very unlikely	22	26.19

Frequency Missing = 49

14G: Decision factors: Lack of time

	Frequency	Percent
Very likely	30	34.48
Likely	4	4.60
Medium	21	24.14
Unlikely	13	14.94
Very unlikely	19	21.84

Frequency Missing = 46

14H: Decision factors: Lack of money

	Frequency	Percent
Very likely	32	36.36
Likely	4	4.55
Medium	19	21.59
Unlikely	11	12.50
Very unlikely	22	25.00

Frequency Missing = 45

14I: Decision factors: Long-term nature of forestry

	Frequency	Percent
Very likely	27	32.93
Likely	8	9.76
Medium	22	26.83
Unlikely	9	10.98
Very unlikely	16	19.51

Frequency Missing = 51

14J: Decision factors: Lack of annual returns from forestry

	Frequency	Percent
Very likely	31	36.05
Likely	7	8.14
Medium	19	22.09
Unlikely	11	12.79
Very unlikely	18	20.93

Frequency Missing = 47

14K: Decision factors: Lack of timber markets

	Frequency	Percent
Very likely	35	42.17
Likely	9	10.84
Medium	24	28.92
Unlikely	5	6.02
Very unlikely	10	12.05

Frequency Missing = 50

14L: Decision factors: Lack of markets for other forest products

	Frequency	Percent
Very likely	36	42.35
Likely	11	12.94
Medium	18	21.18
Unlikely	7	8.24
Very unlikely	13	15.29

Frequency Missing = 48

15: Have forest management plan

	Frequency	Percent
No	111	90.98
Yes	11	9.02

Frequency Missing =11

17A: Help on management plan: Missouri Dept. of Agriculture

	Frequency	Percent
No	11	100.00

Frequency Missing =122

17B: Help on management plan: Missouri Dept. of Conservation

	Frequency	Percent
No	7	63.64
Yes	4	36.36

Frequency Missing =122

17C: Help on management plan: Univ. of Missouri Extension

	Frequency	Percent
No	11	100.00

Frequency Missing =122

17D: Help on management plan: Missouri Dept. of Natural Resources

	Frequency	Percent
No	10	90.91
Yes	1	9.09

Frequency Missing =122

17E: Help on management plan: Natural Resource Conservation Service

	Frequency	Percent
No	9	81.82
Yes	2	18.18

Frequency Missing =122

17F: Help on management plan: Family/Friend

	Frequency	Percent
No	9	81.82
Yes	2	18.18

Frequency Missing= 122

17G: Help on management plan: Neighbor

	Frequency	Percent
No	11	100.00

Frequency Missing= 122

17H: Help on management plan: No one

	Frequency	Percent
No	8	72.73
Yes	3	27.27

Frequency Missing= 122

18A: Adopt reforestation practice at $50/acre level

	Frequency	Percent
No	72	66.67
Yes	36	33.33

Frequency Missing = 25

If 'Yes' to 18A: Acres would enroll at $50/acre

Average Acres	Std Dev	N
28.06	54.64	36
Average Pct. Of Total Acres	**Std Dev**	
25.90%	30.4	
Average Pct. Of Flood Plain Acres	**Std Dev**	
44.40%	40.0	

18B: Adopt reforestation practice at $125/acre level

	Frequency	Percent
No	85	84.16
Yes	16	15.84

Frequency Missing = 32

If 'Yes' to 18B: Acres would enroll at $125/acre

Average Acres	Std Dev	N
23.43	30.19	17
Average Pct. Of Total Acres	**Std Dev**	
33.58%	35.40	
Average Pct. Of Flood Plain Acres	**Std Dev**	
50.3%	38.6	

18C: Adopt reforestation practice at $175/acre level

	Frequency	Percent
No	94	93.07
Yes	7	6.93

Frequency Missing = 32

If 'Yes' to 18C: Acres would enroll at $175/acre

Average Acres	Std Dev	N
30.14	41.41	7
Average Pct. Of Total Acres	**Std Dev**	
48.69%	42.84	
Average Pct. Of Flood Plain Acres	**Std Dev**	
63.1%	37.3	

18D: Adopt reforestation practice at $250/acre level

	Frequency	Percent
No	94	93.07
Yes	7	6.93

Frequency Missing = 32

If 'Yes' to 18D: Acres would enroll at $250/acre

Average Acres	Std Dev	N
28.28	41.87	7
Average Pct. Of Total Acres	**Std Dev**	
47.75%	43.79	
Average Pct. Of Flood Plain Acres	**Std Dev**	
60.9%	39.7	

19A: Quality of forestry service: Missouri Department of Agriculture

	Frequency	Percent
High	7	13.46
Somewhat high	4	7.69
Medium	16	30.77
Somewhat low	10	19.23
Low	15	28.85

Frequency Missing = 81

19B: Quality of forestry service: Missouri Department of Conservation

	Frequency	Percent
High	10	15.87
Somewhat high	4	6.35
Medium	13	20.63
Somewhat low	16	25.40
Low	20	31.75

Frequency Missing = 70

19C: Quality of forestry service: University of Missouri Extension

	Frequency	Percent
High	9	16.36
Somewhat high	8	14.55
Medium	13	23.64
Somewhat low	10	18.18
Low	15	27.27

Frequency Missing = 78

19D: Quality of forestry service: Missouri Department of Natural Resources

	Frequency	Percent
High	18	33.96
Somewhat high	6	11.32
Medium	13	24.53
Somewhat low	5	9.43
Low	11	20.75

Frequency Missing = 80

19E: Quality of forestry service: Natural Resource Conservation Service

	Frequency	Percent
High	16	30.77
Somewhat high	10	19.23
Medium	13	25.00
Somewhat low	6	11.54
Low	7	13.46

Frequency Missing = 81

19F: Quality of forestry service: Timber buyer/logger

	Frequency	Percent
High	15	31.91
Somewhat high	9	19.15
Medium	10	21.28
Somewhat low	7	14.89
Low	6	12.77

Frequency Missing = 86

19G: Quality of forestry service: Farm Bureau

	Frequency	Percent
High	15	29.41
Somewhat high	2	3.92
Medium	12	23.53
Somewhat low	7	13.73
Low	15	29.41

Frequency Missing = 82

20: Age

	Frequency	Percent
20 to 35	5	4.27
36 to 50	17	14.53
51 to 65	50	42.74
65 or over	45	38.46

Frequency Missing =16

21: Gender

	Frequency	Percent
Male	88	75.21
Female	29	24.79

Frequency Missing =16

22: Income

	Frequency	Percent
Under $20,000	10	10.75
$20,000 to $40,000	24	25.81
$40,001 to $60,000	24	25.81
$60,000 or over	35	37.63

Frequency Missing = 40

Acres Owned (calculated)

	Average	Std Dev	N
Total	164.78	198.12	132
Flood Plain	70.11	84.29	132

N Missing = 1

3: Length of ownership:

	Frequency	Percent
Less than 5 years	19	7.36
5 to 15 years	82	31.78
15 to 25 years	55	21.32
25 years or more	102	39.53

Frequency Missing = 20

4: Length of family ownership:

	Frequency	Percent
Less than 5 years	13	5.08
5 to 15 years	46	17.97
15 to 25 years	33	12.89
25 to 50 years	39	15.23
50 years or more	125	48.83

Frequency Missing = 22

5: Live on land:

	Frequency	Percent
No	213	82.24
Yes	46	17.76

Frequency Missing =19

6/8: Have timber

	Frequency	Percent
No	87	35.51
Yes	158	64.49

Frequency Missing = 33

10/11A: Short-term goal: Timber revenue

	Frequency	Percent
Unimportant	103	58.86
Somewhat unimportant	18	10.29
Somewhat important	28	16.00
Important	10	5.71
Very important	16	9.14

Frequency Missing =103

10/11B: Short-term goal: Other forest products

	Frequency	Percent
Unimportant	120	76.43
Somewhat unimportant	14	8.92
Somewhat important	13	8.28
Important	2	1.27
Very important	8	5.10

Frequency Missing =121

10/11C: Short-term goal: Land for family hunting

	Frequency	Percent
Unimportant	68	36.76
Somewhat unimportant	15	8.11
Somewhat important	32	17.30
Important	20	10.81
Very important	50	27.03

Frequency Missing = 93

10/11D: Short-term goal: Row crops

	Frequency	Percent
Unimportant	41	19.16
Somewhat unimportant	1	0.47
Somewhat important	9	4.21
Important	6	2.80
Very important	157	73.36

Frequency Missing = 64

10/11E: Short-term goal: Pasture

	Frequency	Percent
Unimportant	125	75.76
Somewhat unimportant	8	4.85
Somewhat important	14	8.48
Important	6	3.64
Very important	12	7.27

Frequency Missing =113

10/11F: Short-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	113	71.52
Somewhat unimportant	8	5.06
Somewhat important	25	15.82
Important	4	2.53
Very important	8	5.06

Frequency Missing =120

10/11G: Short-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	76	42.22
Somewhat unimportant	16	8.89
Somewhat important	29	16.11
Important	15	8.33
Very important	44	24.44

Frequency Missing = 98

10/11H: Short-term goal: Soil conservation

	Frequency	Percent
Unimportant	32	18.60
Somewhat unimportant	12	6.98
Somewhat important	24	13.95
Important	30	17.44
Very important	74	43.02

Frequency Missing =106

10/11I: Short-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	22	10.84
Somewhat unimportant	13	6.40
Somewhat important	21	10.34
Important	19	9.36
Very important	128	63.05

Frequency Missing = 75

10/11J: Short-term goal: Scenic beauty

	Frequency	Percent
Unimportant	40	22.10
Somewhat unimportant	18	9.94
Somewhat important	34	18.78
Important	25	13.81
Very important	64	35.36

Frequency Missing = 97

11/12: Meeting short term goals

	Frequency	Percent
No	41	16.21
Yes	212	83.79

Frequency Missing = 25

12/13A: Long-term goal: Timber revenue

	Frequency	Percent
Unimportant	97	55.43
Somewhat unimportant	16	9.14
Somewhat important	26	14.86
Important	11	6.29
Very important	25	14.29

Frequency Missing =103

12/13B: Long-term goal: Other forest products

	Frequency	Percent
Unimportant	118	75.16
Somewhat unimportant	10	6.37
Somewhat important	17	10.83
Important	4	2.55
Very important	8	5.10

Frequency Missing =121

12/13C: Long-term goal: Land for family hunting

	Frequency	Percent
Unimportant	63	36.21
Somewhat unimportant	13	7.47
Somewhat important	34	19.54
Important	14	8.05
Very important	50	28.74

Frequency Missing =104

12/13D: Long-term goal: Row crops

	Frequency	Percent
Unimportant	38	17.51
Somewhat unimportant	3	1.38
Somewhat important	11	5.07
Important	8	3.69
Very important	157	72.35

Frequency Missing = 61

12/13E: Long-term goal: Pasture

	Frequency	Percent
Unimportant	124	77.99
Somewhat unimportant	10	6.29
Somewhat important	9	5.66
Important	6	3.77
Very important	10	6.29

Frequency Missing =119

12/13F: Long-term goal: Lease hunting revenue

	Frequency	Percent
Unimportant	110	68.32
Somewhat unimportant	11	6.83
Somewhat important	18	11.18
Important	8	4.97
Very important	14	8.70

Frequency Missing =117

12/13G: Long-term goal: Wildlife viewing

	Frequency	Percent
Unimportant	72	41.14
Somewhat unimportant	14	8.00
Somewhat important	35	20.00
Important	14	8.00
Very important	40	22.86

Frequency Missing =103

12/13H: Long-term goal: Soil conservation

	Frequency	Percent
Unimportant	31	17.71
Somewhat unimportant	8	4.57
Somewhat important	31	17.71
Important	20	11.43
Very important	85	48.57

Frequency Missing =103

12/13I: Long-term goal: Leaving land for children/grandchildren

	Frequency	Percent
Unimportant	21	10.61
Somewhat unimportant	8	4.04
Somewhat important	20	10.10
Important	16	8.08
Very important	133	67.17

Frequency Missing = 80

12/13J: Long-term goal: Scenic beauty

	Frequency	Percent
Unimportant	43	23.89
Somewhat unimportant	16	8.89
Somewhat important	38	21.11
Important	19	10.56
Very important	64	35.56

Frequency Missing = 98

13/14: Meeting long-term goals

	Frequency	Percent
No	36	14.34
Yes	215	85.66

Frequency Missing = 27

16/19A: Quality of forestry service: Missouri Department of Agriculture

	Frequency	Percent
High	30	22.56
Somewhat high	7	5.26
Medium	41	30.83
Somewhat low	22	16.54
Low	33	24.81

Frequency Missing =145

16/19B: Quality of forestry service: Missouri Department of Conservation

	Frequency	Percent
High	30	19.74
Somewhat high	15	9.87
Medium	28	18.42
Somewhat low	36	23.68
Low	43	28.29

Frequency Missing =126

16/19C: Quality of forestry service: University of Missouri Extension

	Frequency	Percent
High	23	16.31
Somewhat high	22	15.60
Medium	32	22.70
Somewhat low	29	20.57
Low	35	24.82

Frequency Missing =137

16/19D: Quality of forestry service: Missouri Department of Natural Resources

	Frequency	Percent
High	43	33.33
Somewhat high	17	13.18
Medium	30	23.26
Somewhat low	17	13.18
Low	22	17.05

Frequency Missing =149

16/19E: Quality of forestry service: Natural Resource Conservation Service

	Frequency	Percent
High	34	27.20
Somewhat high	18	14.40
Medium	39	31.20
Somewhat low	16	12.80
Low	18	14.40

Frequency Missing =153

16/19F: Quality of forestry service: Timber buyer/logger

	Frequency	Percent
High	35	27.78
Somewhat high	25	19.84
Medium	36	28.57
Somewhat low	12	9.52
Low	18	14.29

Frequency Missing =152

16/19G: Quality of forestry service: Farm Bureau

	Frequency	Percent
High	39	32.50
Somewhat high	14	11.67
Medium	32	26.67
Somewhat low	15	12.50
Low	20	16.67

Frequency Missing =158

17/20: Age

	Frequency	Percent
20 to 35	9	3.54
36 to 50	53	20.87
51 to 65	94	37.01
65 or over	98	38.58

Frequency Missing = 24

18/21: Gender

	Frequency	Percent
Male	191	77.64
Female	55	22.36

Frequency Missing = 32

19/22: Income

	Frequency	Percent
Under $20,000	27	13.37
$20,000 to $40,000	53	26.24
$40,001 to $60,000	43	21.29
$60,000 or over	79	39.11

Frequency Missing = 76

Acres Owned (calculated)

	Average	Std Dev	N
Total	160.62	216.88	275
Flood Plain	68.3	92.2	275

N Missing = 3

Means Tables

The following means were calculated using the numeric coding as described in the text (e.g. "Yes" = 1, "No" = 0). The means of ordinal variables were also calculated using the numeric codes (e.g.. for Question 3, "Less than 5 years" = 1, "5 to 15 years" = 2, "15 to 25 years" = 3, and "25 years or more" = 4). Means listed as "midpoint" were calculated using the numeric means of the ranges (e.g. for Question 3, "Less than 5 years" = 4, "5 to 15 years" = 10, "15 to 25 years" = 20, and "25 years or more" = 26).

Question	N	Mean	Miss	Std Dev
3:Length of ownership	135	2.904	10	0.961
4:Length of family ownership	133	3.812	12	1.338
5:Live on land	135	0.185	10	0.390
6:Have timber	128	0.594	17	0.493
7A:Know about timber markets	133	0.759	12	0.429
7B:Know about loggers	133	0.609	12	0.490
7B:Know about timber buyers	134	0.530	11	0.501
7D:Know about saw mills	133	0.466	12	0.501
8A:Where to find out about timber markets: Missouri Dept. of Agriculture	145	0.166	0	0.373
8B:Where to find out about timber markets: Missouri Dept. of Conservation (MDC)	145	0.262	0	0.441
8C:Where to find out about timber markets: University of Missouri Extension	145	0.200	0	0.401
8D:Where to find out about timber markets: Missouri Dept. of Natural Resources (DNR)	145	0.083	0	0.276
8E:Where to find out about timber markets: Natural Resource Conservation Service	145	0.097	0	0.296
8F:Where to find out about timber markets: Soil & Water Conservation District	145	0.131	0	0.339
8G:Where to find out about timber markets: Timber buyer/logger	145	0.469	0	0.501
8H:Where to find out about timber markets: Farm Bureau	145	0.083	0	0.276
8I:Where to find out about timber markets: Neighbor/Friend	145	0.345	0	0.477
8J:Where to find out about timber markets: Do not Know	145	0.207	0	0.406
9:Know about annual income from forested land	128	0.219	17	0.415
10A:Where to find out about annual income from forests: Missouri Dept. of Agriculture	145	0.262	0	0.441
10B:Where to find out about annual income from forests: Missouri Dept. of Conservation (MDC)	145	0.234	0	0.425
10C:Where to find out about annual income from forests: University of Missouri Extension	145	0.248	0	0.434
10D:Where to find out about annual income from forests: Missouri Dept. of Natural Resources (DNR)	145	0.103	0	0.306

Question	N	Mean	Miss	Std Dev
10E:Where to find out about timber markets: Natural Resource Conservation Service	145	0.131	0	0.339
10F:Where to find out about annual income from forests: Soil & Water Conservation District	145	0.138	0	0.346
10G:Where to find out about annual income from forests: Timber buyer/logger	145	0.090	0	0.287
10H:Where to find out about annual income from forests: Farm Bureau	145	0.083	0	0.276
10I:Where to find out about annual income from forests: Neighbor/Friend	145	0.200	0	0.401
10J:Where to find out about annual income from forests: Do not Know	145	0.262	0	0.441
11A:Short term goal: Timber revenue	91	1.912	54	1.314
11B:Short term goal: Other forest products	84	1.488	61	1.035
11C:Short term goal: Land for family hunting	96	2.750	49	1.661
11D:Short term goal: Row crops	110	4.100	35	1.574
11E:Short term goal: Pasture	90	1.578	55	1.208
11F:Short term goal: Lease hunting revenue	85	1.600	60	1.146
11G:Short term goal: Wildlife viewing	96	2.552	49	1.679
11H:Short term goal: Soil conservation	87	3.402	58	1.559
11I:Short term goal: Leaving land for children/grandchildren	101	3.891	44	1.496
11J:Short term goal: Scenic beauty	97	3.155	48	1.635
12:Meeting short term goals	130	0.854	15	0.355
13A:Long term goal: Timber revenue	92	2.163	53	1.507
13B:Long term goal: Other forest products	84	1.548	61	1.091
13C:Long term goal: Land for family hunting	91	2.747	54	1.651
13D:Long term goal: Row crops	112	4.098	33	1.571
13E:Long term goal: Pasture	85	1.400	60	0.990
13F:Long term goal: Lease hunting revenue	87	1.759	58	1.329
13G:Long term goal: Wildlife viewing	93	2.452	52	1.585
13H:Long term goal: Soil conservation	89	3.427	56	1.566
13I:Long term goal: Leaving land for children/grandchildren	102	4.020	43	1.462
13J:Long term goal: Scenic beauty	95	3.116	50	1.649
14:Meeting long term goals	130	0.869	15	0.338
15A:Where to go for information on managing forests: Missouri Dept. of Agriculture	145	0.290	0	0.455
15B:Where to go for information on managing forests: Missouri Dept. of Conservation (MDC)	145	0.255	0	0.437
15C:Where to go for information on managing forests: University of Missouri Extension	145	0.248	0	0.434

Question	N	Mean	Miss	Std Dev
15D:Where to go for information on managing forests: Missouri Dept. of Natural Resources (DNR)	145	0.097	0	0.296
15E:Where to go for information on managing forests: Natural Resource Conservation Service	145	0.131	0	0.339
15F:Where to go for information on managing forests: Soil & Water Conservation District	145	0.276	0	0.448
15G:Where to go for information on managing forests: Timber buyer/logger	145	0.083	0	0.276
15H:Where to go for information on managing forests: Farm Bureau	145	0.090	0	0.287
15I:Where to go for information on managing forests: Neighbor/Friend	145	0.179	0	0.385
15J:Where to go for information on managing forests: Do not Know	145	0.214	0	0.411
16A:Quality of forestry service: Missouri Department of Agriculture	81	2.988	64	1.496
16B:Quality of forestry service: Missouri Department of Conservation	89	3.169	56	1.509
16C:Quality of forestry service: University of Missouri Extension	86	3.198	59	1.396
16D:Quality of forestry service: Missouri Department of Natural Resources	76	2.645	69	1.449
16E:Quality of forestry service: Natural Resource Conservation Service	73	2.836	72	1.354
16F:Quality of forestry service: Timber buyer/logger	79	2.658	66	1.339
16G:Quality of forestry service: Farm Bureau	69	2.391	76	1.274
17:Age	137	4.066	8	0.876
18:Gender	129	1.202	16	0.403
19:Income	109	2.826	36	1.129
Acres owned (calculated)	143	156.779	2	233.505
Flood Plain Acres owned (calculated)	143	66.709	2	99.356
Years owned (midpoints)	135	17.715	10	7.728
Years family owned (midpoints)	133	34.628	12	18.060
Age (midpoints)	137	56.263	8	10.432
Income (midpoints)	109	42880.700	36	18905.087

Question	N	Mean	Miss	Std Dev
3:Length of ownership	123	2.959	10	1.051
4:Length of family ownership	123	3.886	10	1.332
5:Live on land	124	0.169	9	0.377
6:Will continue to own the land	112	3.375	21	0.912
7A:Current management: Row crops	133	0.677	0	0.470
7B:Current management: Pasture	133	0.053	0	0.224
7C:Current management: Tree farm/timber	133	0.195	0	0.398
7D:Current management: Wildlife habitat	133	0.308	0	0.464
7E:Current management: Land for Family Hunting	133	0.271	0	0.446
7F:Current management: Agroforestry	133	0.000	0	0.000
7G:Current management: Lease hunting	133	0.045	0	0.208
8:Have timber	117	0.701	16	0.460
9A:Current forest practices: Timber Stand Improvement	133	0.075	0	0.265
9B:Current forest practices: Timber sale	133	0.241	0	0.429
9C:Current forest practices: Forest Health Monitoring	133	0.000	0	0.000
9D:Current forest practices: Fencing	133	0.015	0	0.122
9E:Current forest practices: Tree planting	133	0.045	0	0.208
9F:Current forest practices: Burning	133	0.023	0	0.149
9G:Current forest practices: Firewood cutting	133	0.090	0	0.288
10A:Short term goal: Timber revenue	84	2.012	49	1.384
10B:Short term goal: Other forest products	73	1.507	60	1.082
10C:Short term goal: Land for family hunting	89	2.921	44	1.646
10D:Short term goal: Row crops	104	4.115	29	1.609
10E:Short term goal: Pasture	75	1.667	58	1.256
10F:Short term goal: Lease hunting revenue	73	1.699	60	1.151
10G:Short term goal: Wildlife viewing	84	2.738	49	1.622
10H:Short term goal: Soil conservation	85	3.788	48	1.505
10I:Short term goal: Leaving land for children/grandchildren	102	4.255	31	1.287
10J:Short term goal: Scenic beauty	84	3.476	49	1.477
11:Meeting short term goals	123	0.821	10	0.385
12A:Long term goal: Timber revenue	83	2.133	50	1.488
12B:Long term goal: Other forest products	73	1.575	60	1.142
12C:Long term goal: Land for family hunting	83	2.976	50	1.667
12D:Long term goal: Row crops	105	4.143	28	1.534
12E:Long term goal: Pasture	74	1.703	59	1.321
12F:Long term goal: Lease hunting revenue	74	1.824	59	1.318

Question	N	Mean	Miss	Std Dev
12G:Long term goal: Wildlife viewing	82	2.841	51	1.629
12H:Long term goal: Soil conservation	86	3.953	47	1.463
12I:Long term goal: Leaving land for children/grandchildren	96	4.333	37	1.245
12J:Long term goal: Scenic beauty	85	3.400	48	1.513
13:Meeting long term goals	121	0.843	12	0.365
14A:Decision factors: Knowledge of forest growth and health	89	2.809	44	1.551
14B:Decision factors: Availability of professional advice	88	2.830	45	1.533
14C:Decision factors: Cost of professional advice	83	2.940	50	1.618
14D:Decision factors: Tax incentives	89	3.180	44	1.669
14E:Decision factors: Government cost share programs	87	3.299	46	1.685
14F:Decision factors: Conservation easements	84	2.774	49	1.638
14G:Decision factors: Lack of time	87	2.851	46	1.567
14H:Decision factors: Lack of money	88	2.852	45	1.623
14I:Decision factors: Long term nature of forestry	82	2.744	51	1.506
14J:Decision factors: Lack of annual returns from forestry	86	2.744	47	1.566
14K:Decision factors: Lack of timber markets	83	2.349	50	1.392
14L:Decision factors: Lack of markets for other forest products	85	2.412	48	1.482
15:Have forest management plan	122	0.090	11	0.288
17A:Help on management plan: Missouri Dept. of Agriculture	11	0.000	122	0.000
17B:Help on management plan: Missouri Dept. of Conservation	11	0.364	122	0.505
17C:Help on management plan: Univ. of Missouri Extension	11	0.000	122	0.000
17D:Help on management plan: Missouri Dept. of Natural Resources	11	0.091	122	0.302
17E:Help on management plan: Natural Resource Conservation Service	11	0.182	122	0.405
17F:Help on management plan: Family/Friend	11	0.182	122	0.405
17G:Help on management plan: Neighbor	11	0.000	122	0.000
17H:Help on management plan: No one	11	0.273	122	0.467
18A:Adopt reforestation practice at $50/acre level	108	0.333	25	0.474
Acres/enrollee at $50/acre	36	28.056	97	54.642
Pct. (of land owned) enrolled at $50/acre	36	0.259	97	0.304
Pct. (of flood plain land owned) enrolled at $50/acre	36	0.444	97	0.400
18B:Adopt reforestation practice at $125/acre level	101	0.158	32	0.367

Question	N	Mean	Miss	Std Dev
Acres/enrollee at $125/acre	16	23.438	117	30.193
Pct. (of land owned) enrolled at $125/acre	16	0.336	117	0.354
Pct. (of flood plain land owned) enrolled at $50/acre	16	0.504	117	0.386
18C:Adopt reforestation practice at $175/acre level	101	0.069	32	0.255
Acres/enrollee at $175/acre	7	30.143	126	41.410
Pct. (of land owned) enrolled at $175/acre	7	0.487	126	0.428
Pct. (of flood plain land owned) enrolled at $50/acre	7	0.631	126	0.373
18D:Adopt reforestation practice at $250/acre level	101	0.069	32	0.255
Acres/enrollee at $250/acre	7	28.286	126	41.880
Pct. (of land owned) enrolled at $250/acre	7	0.478	126	0.438
Pct. (of flood plain land owned) enrolled at $50/acre	7	0.609	126	0.398
19A:Quality of forestry service: Missouri Department of Agriculture	52	3.423	81	1.348
19B:Quality of forestry service: Missouri Department of Conservation	63	3.508	70	1.413
19C:Quality of forestry service: University of Missouri Extension	55	3.255	78	1.430
19D:Quality of forestry service: Missouri Department of Natural Resources	53	2.717	80	1.536
19E:Quality of forestry service: Natural Resource Conservation Service	52	2.577	81	1.391
19F:Quality of forestry service: Timber buyer/logger	47	2.574	86	1.410
19G:Quality of forestry service: Farm Bureau	51	3.098	82	1.603
20:Age	117	4.154	16	0.826
21:Gender	117	1.248	16	0.434
22:Income	93	2.903	40	1.033
Acres owned (calculated)	132	164.780	1	198.118
Flood Plain Acres owned (calculated)	132	70.114	1	84.299
Years owned (midpoints)	123	18.114	10	8.369
Years family owned (midpoints)	123	35.646	10	17.886
Age (midpoints)	117	57.594	16	9.886
Income (midpoints)	93	44677.40	40	17194.641
Adopt at some level (pct.)	133	0.278	0	0.450
Highest level of adoption (range 0 through 4)	133	0.504	0	1.012

Means Tables – Common Variables from the Knowledge and Behavior Surveys

Question	N	Mean	Miss	Std Dev
3:Length of ownership	258	2.930	20	1.003
4:Length of family ownership	256	3.848	22	1.333
5:Live on land	259	1.822	19	0.383
6/8:Have timber	245	0.645	33	0.480
10/11A:Short term goal: Timber revenue	175	1.960	103	1.345
10/11B:Short term goal: Other forest products	157	1.497	121	1.054
10/11C:Short term goal: Land for family hunting	185	2.832	93	1.651
10/11D:Short term goal: Row crops	214	4.107	64	1.587
10/11E:Short term goal: Pasture	165	1.618	113	1.227
10/11F:Short term goal: Lease hunting revenue	158	1.646	120	1.146
10/11G:Short term goal: Wildlife viewing	180	2.639	98	1.650
10/11H:Short term goal: Soil conservation	172	3.593	106	1.540
10/11I:Short term goal: Leaving land for children/grandchildren	203	4.074	75	1.403
10/11J:Short term goal: Scenic beauty	181	3.304	97	1.568
11/12:Meeting short term goals	253	0.838	25	0.369
12/13A:Long term goal: Timber revenue	175	2.149	103	1.494
12/13B:Long term goal: Other forest products	157	1.561	121	1.111
12/13C:Long term goal: Land for family hunting	174	2.856	104	1.658
12/13D:Long term goal: Row crops	217	4.120	61	1.550
12/13E:Long term goal: Pasture	159	1.541	119	1.162
12/13F:Long term goal: Lease hunting revenue	161	1.789	117	1.320
12/13G:Long term goal: Wildlife viewing	175	2.634	103	1.613
12/13H:Long term goal: Soil conservation	175	3.686	103	1.534
12/13I:Long term goal: Leaving land for children/grandchildren	198	4.172	80	1.367
12/13J:Long term goal: Scenic beauty	180	3.250	98	1.589
13/14:Meeting long term goals	251	0.857	27	0.351
16/19A:Quality of forestry service: Missouri Department of Agriculture	133	3.158	145	1.450
16/19B:Quality of forestry service: Missouri Department of Conservation	152	3.309	126	1.475
16/19C:Quality of forestry service: University of Missouri Extension	141	3.220	137	1.405
16/19D:Quality of forestry service: Missouri Department of Natural Resources	129	2.674	149	1.480
16/19E:Quality of forestry service: Natural Resource Conservation Service	125	2.728	153	1.370
16/19F:Quality of forestry service: Timber buyer/logger	126	2.627	152	1.361

Means Tables – Common Variables from the Knowledge and Behavior Surveys

Question	N	Mean	Miss	Std Dev
16/19G:Quality of forestry service: Farm Bureau	120	2.692	158	1.460
17/20:Age	254	4.106	24	0.853
18/21:Gender	246	1.224	32	0.417
19/22:Income	202	2.861	76	1.084
Acres owned (calculated)	275	160.620	3	216.885
Flood Plain Acres owned (calculated)	275	68.343	3	92.284
Years owned (midpoints)	258	17.905	20	8.027
Years owned (midpoints)	256	35.117	22	17.948
Age (midpoints)	254	56.876	24	10.186
Income (midpoints)	202	43707.90	76	18115.408

Appendices

Appendix 1: Knowledge Survey

Missouri River Flood Plain Landowners

A survey by the Missouri Department of Conservation.

Note: This survey was printed and mailed to respondents as a 5½” by 8" booklet.

This survey will help design programs to benefit Missouri River flood plain landowners. **It is NOT designed to sell you products or seek donations.**

Please take a few minutes to tell us about yourself, your land and your plans. There are no right or wrong answers. Feel free to express your opinions and to base your answers on your own experiences. The survey is voluntary.

Your answers remain strictly confidential. Your name will never be associated with your answers or included in any report.

Instructions: Please read each question carefully and check the box ☒ that best represents your answer.

Thank you for your time and cooperation.

1 **Flood plain**, or bottomland, is nearly level low land that lies on either or both sides of rivers or streams. Do you currently **own** flood plain land that lies next to the **Missouri River**?

Yes ..... □
No..... □
Don't Know..... □

2 This survey concerns flood plain land along the **Missouri River**. If you answered **No** above, check this box..... □
and please skip to Question 17

3 How long have **you** owned land in the flood plain?

Less than 5 years ..... □
5 to 15 years ..... □
15 to 25 years ..... □
25 years or more..... □

4 How long has this land been in **your family**?

Less than 5 years ..... □
5 to 15 years..... □
15 to 25 years..... □
25 to 50 years..... □
50 years or more..... □
Don't know ..... □

5 Do you **live** on this land?

Yes ..... □
No..... □

6 Do you have forest, timber or wood lots on your flood plain land?

Yes ..... □
No..... □
Don't Know..... □

7a Are there **markets** for timber products in your area?

Yes ..... □
No..... □
Don't Know..... □

7b Are there **loggers** harvesting timber in your area?

Yes ..... □
No..... □
Don't Know..... □

7c Are there **timber buyers** working in your area?

Yes ..... □
No..... □
Don't Know..... □

7d Are there **saw mills** operating in your area?

Yes ..... □
No..... □
Don't Know..... □

8 Where would you go to find out about timber markets, buyers, loggers, or log mills in your area? (Check all that apply)

Missouri Dept. of Agriculture..... □
Missouri Dept. of Conservation (MDC). □
University of Missouri Extension ..... □
Missouri Dept. of Natural Resources ..... □
Natural Resource Conservation Service □
Soil & Water Conservation District..... □
Timber buyer/logger..... □
Farm Bureau ..... □
Neighbor/Friend..... □
Don't Know ..... □

9 Are there ways to earn an **annual income** from your forested flood plain land (while timber is maturing)?

Yes ..... □
No..... □
Don't Know..... □

10 Where would you go to find out about ways to earn an annual income from flood plain land? (Check all that apply)

Missouri Dept. of Agriculture..... □
Missouri Dept. of Conservation (MDC). □
University of Missouri Extension ..... □
Missouri Dept. of Natural Resources ..... □
Natural Resource Conservation Service □
Soil & Water Conservation District..... □
Timber buyer/logger..... □
Farm Bureau ..... □
Neighbor/Friend..... □
Don't Know ..... □

11 Which are your most important **short term** goals (less than 5 years) of owning flood plain land? (From **5 = very important to 1 = unimportant**.)

Timber revenue 5 4 3 2 1
Other forest products 5 4 3 2 1
Land for family hunting 5 4 3 2 1
Row crops 5 4 3 2 1
Pasture 5 4 3 2 1
Lease hunting revenue 5 4 3 2 1
Wildlife viewing 5 4 3 2 1
Soil conservation 5 4 3 2 1
Leaving land for children/grandchildren 5 4 3 2 1
Scenic beauty 5 4 3 2 1

12 Are you **currently** managing your flood plain land to meet your short term (less than 5 years) financial and personal goals?

Yes ..... □
No..... □

13 Which are your most important **long term** goals (more than 5 years) of owning flood plain land? (From **5 = very important to 1 = unimportant**.)

Timber revenue 5 4 3 2 1
Other forest products 5 4 3 2 1
Land for family hunting 5 4 3 2 1
Row crops 5 4 3 2 1
Pasture 5 4 3 2 1
Lease hunting revenue 5 4 3 2 1
Wildlife viewing 5 4 3 2 1
Soil conservation 5 4 3 2 1
Leaving land for children/grandchildren 5 4 3 2 1
Scenic beauty 5 4 3 2 1

14 Are you **currently** managing your flood plain land to meet your long term (more than 5 years) financial and personal goals?

Yes ..... □
No..... □

15 Who would you contact for **information** on managing or planning for your flood plain land? (Check all that apply)

Missouri Dept. of Agriculture..... □
Missouri Dept. of Conservation (MDC). □
Univ. of Missouri Extension..... □
Missouri Dept. of Natural Resources .... □
Natural Resource Conservation Service □
Soil & Water Conservation District..... □
Timber buyer/logger..... □
Farm Bureau ..... □
Neighbor/Friend..... □
Don't Know ..... □

16 What quality of forestry service (from **5=high to 1=low**, NA=don't know/irrelevant) would you expect from: (please circle one for each agency):

	Hi				Low	
Missouri Department of Agriculture	**5**	**4**	**3**	**2**	**1**	**NA**
Missouri Department of Conservation	**5**	**4**	**3**	**2**	**1**	**NA**
University of Missouri Extension	**5**	**4**	**3**	**2**	**1**	**NA**
Missouri Department of Natural Resources	**5**	**4**	**3**	**2**	**1**	**NA**
Natural Resource Conservation Service	**5**	**4**	**3**	**2**	**1**	**NA**
Timber buyer/logger	**5**	**4**	**3**	**2**	**1**	**NA**
Farm Bureau	**5**	**4**	**3**	**2**	**1**	**NA**

17 What is your **age**?

Under 20..... □
20 to 35 ..... □
36 to 50 ..... □
51 to 65 ..... □
65 or over ..... □

18 Are you:

Male..... □
Female ..... □

19 What is your annual **income**?

Under $20,000..... □
$20,000 to $40,000 ..... □
$40,001 to $60,000 ..... □
$60,000 or over ..... □

20 Please tape this survey booklet closed and place it in any mailbox. Postage is already paid.

Thank you for your time and help.

Appendix 2: Behavior Survey

Missouri River Flood Plain Landowners

A survey by the Missouri Department of Conservation.

Note: This survey was printed and mailed to respondents as a 5½” by 8" booklet.

This survey will help design programs to benefit Missouri River flood plain landowners. **It is NOT designed to sell you products or seek donations.**

Please take a few minutes to tell us about yourself, your land and your plans. There are no right or wrong answers. Feel free to express your opinions and to base your answers on your own experiences. The survey is voluntary.

Your answers remain strictly confidential. Your name will never be associated with your answers or included in any report.

Instructions: Please read each question carefully and check the box ☒ that best represents your answer.

Thank you for your time and cooperation.

1 **Flood plain**, or bottomland, is nearly level low land that lies on either or both sides of rivers or streams. Do you currently **own** flood plain land that lies next to the **Missouri River**?

Yes ..... □
No..... □
Don't Know..... □

2 This survey concerns flood plain land along the **Missouri River**. If you answered **No** above, check this box..... □
and please skip to Question 19

3 How long have **you** owned land in the flood plain?

Less than 5 years ..... □
5 to 15 years ..... □
15 to 25 years ..... □
25 years or more..... □

4 How long has this land been in **your family**?

Less than 5 years ..... □
5 to 15 years..... □
15 to 25 years..... □
25 to 50 years..... □
50 years or more..... □
Don't know ..... □

5 Do you **live** on this land?

Yes ..... □
No..... □

6 How likely is it that for the land you own someone in your family will continue to own at least a portion of the land that 25 years from now?

Very unlikely ..... □
Unlikely..... □
Likely..... □
Very likely..... □
Don't know ..... □

7 How do you currently **manage** your flood plain land? (Check all that apply)

Row crops ..... □
Pasture ..... □
Tree farm/timber ..... □
Wildlife habitat..... □
Land for Family Hunting □
Agroforestry ..... □
Lease hunting ..... □

8 Do you have forest, timber or wood lots on your flood plain land?

Yes ..... □
No..... □
Don't Know..... □

9 Do you currently implement any **forest management** practices on your flood plain land? (Check all that apply)

Timber Stand Improvement (TSI) ..... □
Timber sale ..... □
Forest Health Monitoring..... □
Fencing ..... □
Tree planting ..... □
Burning ..... □
Firewood cutting ..... □

10 Which are your most important **short term** goals (less than 5 years) of owning flood plain land? (From **5 = very important to 1 = unimportant**.)

Timber revenue **5 4 3 2 1**
Other forest products **5 4 3 2 1**
Land for family hunting **5 4 3 2 1**
Row crops **5 4 3 2 1**
Pasture **5 4 3 2 1**
Lease hunting revenue **5 4 3 2 1**
Wildlife viewing **5 4 3 2 1**
Soil conservation **5 4 3 2 1**
Leaving land for children/grandchildren **5 4 3 2 1**
Scenic beauty **5 4 3 2 1**

11 Are you **currently** managing your flood plain land to meet your short term (less than 5 years) financial and personal goals?

Yes ..... □
No..... □

12 Which are your most important **long term goals** (more than 5 years) of owning flood plain land? (From **5 = very important to 1 = unimportant**.)

Timber revenue 5 4 3 2 1
Other forest products 5 4 3 2 1
Land for family hunting 5 4 3 2 1
Row crops 5 4 3 2 1
Pasture 5 4 3 2 1
Lease hunting revenue 5 4 3 2 1
Wildlife viewing 5 4 3 2 1
Soil conservation 5 4 3 2 1
Leaving land for children/grandchildren 5 4 3 2 1
Scenic beauty 5 4 3 2 1

13 Are you **currently** managing your flood plain land to meet your long term (more than 5 years) financial and personal goals?

Yes ..... □
No..... □

14 From the list below rank (from **5 = very likely to affect my decision to 1 = very unlikely to affect my decision**) the factors that affect forest management decisions.

Knowledge of forest growth and health 5 4 3 2 1
Availability of professional advice 5 4 3 2 1
Cost of professional advice.....5 4 3 2 1
Tax incentives.....5 4 3 2 1
Government cost share programs 5 4 3 2 1
Conservation easements 5 4 3 2 1
Lack of time 5 4 3 2 1
Lack of money 5 4 3 2 1
Long term nature of forestry 5 4 3 2 1
Lack of annual returns from forestry 5 4 3 2 1
Lack of timber markets.....5 4 3 2 1
Lack of markets for other forest products.....5 4 3 2 1

15 Have you ever developed a forest management **plan** for your flood plain land?

Yes ..... □
No..... □

16 If you answered **No** to Question 15, please check this box ☐
and skip to Question 18.

17 **Which** of these agencies, if any, helped you develop your land or forest management plan for your flood plain land? (Check all that apply)

Missouri Dept. of Agriculture ..... ☐
Missouri Dept. of Conservation ..... ☐
Univ. of Missouri Extension ..... ☐
Missouri Dept. of Natural Resources .... ☐
Natural Resource Conservation Service ☐
Family/Friend ..... ☐
Neighbor ..... ☐
No one ..... ☐

18 Hardwood bottomland forest restoration involves the planting of specially selected and grown trees such as black walnut, swamp white oak, bur oak and others. These species have potential for **high commercial timber value** on a 60-80 year rotation and also provide **annual value** as the source of other forest products, such as nuts. These trees also provide food and habitat for wildlife and help soil conservation. The trees are planted on raised beds if necessary, fertilized and use fiber-based mats to control weeds. There is also the opportunity to interplant other annual **revenue** producing crops, such as red top clover, with the trees.

To encourage this forest restoration, the State of Missouri is considering developing different programs to encourage bottomland owners to participate. These potential programs all plant the same trees. They differ only in the cost share between you and the state.

Please read the four potential programs on the next page and indicate whether or not you would enroll in each one, and, if so, how many acres you would enroll.

Please answer **Yes** or **No** for each of the following programs.

Program	Enroll?	Acres?
18A Professional advice, planning and trees are provided free of charge. Tree planting and maintenance are paid on a cost share of 10% you/90% state. Your estimated cost: $**50** per acre.	Would you enroll? **Yes....**□ **No...**□	If **Yes**, how many acres would you enroll? _____

18B Professional advice, planning and trees are provided free of charge. Tree planting and maintenance are paid on a cost share of 25% you/75% state. Your estimated cost: $**125** per acre.	Would you enroll? **Yes....**□ **No...**□	If **Yes**, how many acres would you enroll? _____

18C Professional advice, planning and trees are provided free of charge. Tree planting and maintenance are paid on a cost share of 35% you/65% state. Your estimated cost: $**175** per acre.	Would you enroll? **Yes....**□ **No...**□	If **Yes**, how many acres would you enroll? _____

18D Professional advice, planning and trees are provided free of charge. Tree planting and maintenance are paid on a cost share of 50% you/50% state. Your estimated cost: $**250** per acre.	Would you enroll? **Yes....**□ **No...**□	If **Yes**, how many acres would you enroll? _____

19 What quality of forestry service (from **5=high to 1=low**, NA=don't know/irrelevant) would you expect from: (please circle one for each agency):

	Hi				Low	
Missouri Department of Agriculture	**5**	**4**	**3**	**2**	**1**	**NA**
Missouri Department of Conservation	**5**	**4**	**3**	**2**	**1**	**NA**
University of Missouri Extension	**5**	**4**	**3**	**2**	**1**	**NA**
Missouri Department of Natural Resources	**5**	**4**	**3**	**2**	**1**	**NA**
Natural Resource Conservation Service	**5**	**4**	**3**	**2**	**1**	**NA**
Timber buyer/logger	**5**	**4**	**3**	**2**	**1**	**NA**
Farm Bureau	**5**	**4**	**3**	**2**	**1**	**NA**

20 What is your **age**?

Under 20..... □
20 to 35 ..... □
36 to 50 ..... □
51 to 65 ..... □
65 or over ..... □

21 Are you:

Male..... □
Female ..... □

22 What is your annual **income**?

Under $20,000..... □
$20,000 to $40,000 ..... □
$40,001 to $60,000 ..... □
$60,000 or over ..... □

23 Please tape this survey booklet closed and place it in any mailbox. Postage is already paid.

Thank you for your time and help.

Appendix 3: First Contact Letter

Dear <NAME>

Within the next few days, you will receive a request to complete a brief questionnaire for the *Missouri Flood Plain Project*. We are mailing it to you in an effort to learn how landowners near the Missouri River feel about forestry and natural resource issues.

The survey is being conducted to help the Missouri Department of Conservation develop informational and educational programs that will help interested landowners to manage their lands to meet their goals.

We would greatly appreciate your taking the few minutes necessary to complete and return your questionnaire. Postage is pre-paid and all responses are completely and strictly confidential. Your participation is voluntary and refusal to participate or discontinuation of participation at any time will involve no penalty or loss of benefits to which you are otherwise entitled.

Thank you in advance for your help.

Sincerely,
Thomas Treiman
Natural Resource Economist
Missouri Department of Conservation
1110 S. College Ave.
Columbia, MO 65201
(573) 882-9880, e-mail: treimt@mail.conservation.state.mo.us

Ref. No: #

Appendix 4: Second Contact Letter (mailed with the surveys)

Dear Missouri River Flood Plain Landowner,

As a landowner near the Missouri River, you may have heard about the opportunity of managing or reforesting flood plain land. As part of the *Missouri Flood Plain Project*, the Missouri Department of Conservation is sending a questionnaire to flood plain landowners. The purpose of this questionnaire is to learn if there is an interest by landowners in adopting forest management in the flood plains on lands on the unprotected (river) side of the levee.

We obtained your name and address from land ownership records at the local tax assessors office in your county. Using aerial photos we tried to identify those lands that lie within the flood plain of the Missouri River. Enclosed is a short questionnaire. It should take less than 10 minutes to complete. All responses are completely confidential. Your participation is voluntary and refusal to participate or discontinuation of participation at any time will involve no penalty or loss of benefits to which you are otherwise entitled.

The questionnaire has an identification number for mailing purposes only. This is so we may check your name off the mailing list when your questionnaire is returned. Once the questionnaire is completed your answers along with others will be recorded and summarized, and the original mailing list will be destroyed. Your opinions and identity will remain private. This survey is for research that will benefit landowners. It is NOT designed to sell you products or seek donations.

We would be happy to answer any questions you may have about this study. Please feel free to write or call me at the address and number below.

Thank you very much for your time and assistance,

Thomas Treiman
Natural Resource Economist, Missouri Department of Conservation
1110 S. College Ave.
Columbia, MO 65201
(573) 882-9880, e-mail: treimt@mail.conservation.state.mo.us

Appendix 5: Third Contact, Postcard Follow-up

Last week a questionnaire seeking your opinions about forest management on Missouri River flood plain lands was mailed to you. Your name was drawn randomly from a list of all Missouri River landowners compiled at the tax assessor's office in your county.

If you have already completed and returned the questionnaire to us, please accept our sincere thanks for your help. If not, please consider taking the few minutes necessary to fill out the questionnaire today. Your responses are important and will help the Missouri Department of Conservation develop informational and educational programs that will help interested landowners to manage their land to meet their goals. All responses are voluntary and completely confidential.

If you did not receive a questionnaire or it was misplaced, please call me at (573) 882-9880 and I will get another one in the mail to you today.

Thomas Treiman
Natural Resource Economist
Missouri Department of Conservation
e-mail: treimt@mail.conservation.state.mo.us

Appendix 6: Fourth Contact Letter, mailed with new survey to non-respondents

Dear <NAME>,

About four weeks ago, I wrote to you seeking your opinions about managing or reforesting flood plain land. As of today, I have not received your completed questionnaire. I realize you may not have had time to complete it. However, I would genuinely appreciate hearing from you.

The questionnaire is part of the Missouri Flood Plain Project, run by the Missouri Department of Conservation. The purpose of this questionnaire is to learn if there is an interest by landowners in adopting forest management in the flood plains on lands on the unprotected (river) side of the levee. The study's usefulness depends on receiving a completed questionnaire from every landowner. Your name and address was obtained from land ownership records at the local tax assessor's office in your county. It should take less than 10 minutes to complete the questionnaire. Participation is voluntary and all responses are completely confidential.

The questionnaire has an identification number for mailing purposes only. This is so we may check your name off the mailing list when your questionnaire is returned. Once the questionnaire is completed your answers along with others will be recorded and summarized, and the original mailing list will be destroyed. Your opinions and identity will remain private. This survey is for research that will benefit landowners. It is NOT designed to sell you products or seek donations.

In the event that your questionnaire has been misplaced, a replacement is enclosed. I would be happy to answer any questions you may have about this study. Please feel free to write or call me at the address and number below.

Thank you very much for your time and assistance,

Thomas Treiman
Natural Resource Economist, Missouri Department of Conservation
1110 S. College Ave.
Columbia, MO 65201
(573) 882-9880, e-mail: treimt@mail.conservation.state.mo.us

Ref. No: #


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